

## VPDES PERMIT FACT SHEET

This document gives pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a Minor, Industrial permit. The effluent limitations contained in this permit will maintain the Water Quality Standards in 9VAC25-260. The discharge results from the operation of a potable water treatment facility. Under normal operating procedures the facility is linked to the municipal sewer and effluent is transferred to Falling Creek WWTP; this permit is maintained for extraordinary circumstances during which a discharge to Swift Creek is unavoidable. This permit action consists of updating applicable effluent limitations and monitoring requirements.

1. Facility Name and Address: SIC Code: 4941  
Addison/Evans Water Production and Laboratory Facility  
Utilities Department  
P.O. Box 608  
Chesterfield, VA 23832  
  
Location: 13400 Hull Street Road  
Chesterfield County
2. Permit No. VA0006254 Existing Permit Expiration Date:  
January 30, 2011
3. Owner Contact: Name: George Duval, Chesterfield County Utilities Department  
Title: Plant Manager  
Telephone No: (804) 318-8140
4. Application Complete Date: October 19, 2010  
Permit Drafted By: Janine Howard Date: 10/27/2010  
DEQ Regional Office: Piedmont Regional Office  
Reviewed By: Brad Ricks Date: 11/15/2010  
Curt Linderman Date: 12/3/2010  
Public Comment Period Dates: 3/1/2011 to 4/1/2011
5. Receiving Stream Name: Swift Creek  
River Mile: 2-SFT030.73  
Basin: Appomattox River  
Subbasin: NA  
Section: 5d  
Class: III  
Special Standards: None  
  
7-Day, 10-Year Low Flow: 0.0 MGD 1-Day, 10-Year Low Flow: 0.0 MGD  
  
30-Day, 5-Year Low Flow: 0.0 MGD Harmonic Mean Flow: 0.0 MGD  
  
30-Day, 10-Year Low Flow 0.0 MGD  
  
Tidal? NO On 303(d) list? YES  
Attachment A: Flow Frequency Analysis
6. Operator License Requirements: None
7. Reliability Class: N/A

8. Permit Characterization:  
☐ Private ☐ Federal ☐ State ☒ POTW  
☐ Possible Interstate Effect  
☐ Interim Limits in Other Document (attach to Fact Sheet)

9. Discharge Description:

OUTFALL NUMBER	DISCHARGE SOURCE	TREATMENT	FLOW
001	Water Treatment Plant-settling basin sludge and washwater, and filter backwash.	Three-cell sludge lagoon	0.50 MGD (Monthly Average)

Note: The 2000 permit was issued for an average flow of 0.5 MGD. During the 2006 reissuance the county determined that 0.3 MGD was a more accurate figure for a potential discharge and the permit was issued accordingly. This was based on the assumption that if required to discharge to Swift Creek the facility would hold production to a minimum. However, increased demands on Chesterfield County Public Water Supply in recent years may not allow plant production to be reduced if a discharge to Swift Creek is unavoidable. An average effluent flow of 0.5 MGD is considered by the County as a more appropriate figure if a discharge into Swift Creek were to occur and is reflected in their 2011 permit. This action is not associated with a plant expansion or a substantial facility modification; therefore, riparian landowner and local government notification was not required.

See Attachment B: Site Visit Report

Attachment C: Plant Flow Diagram

10. Sewage Sludge Use or Disposal:  
The wastewater treatment process at this facility does not generate sewage sludge.
11. Discharge(s) Location Description: The outfall is positioned to discharge to a dry ditch which converges with Swift Creek directly below the Swift Creek Reservoir dam. (Discharge will occur only in extraordinary circumstances).

See Attachment D- Halsboro Topographic Map (USGS Quadrangle 100B)

12. Material Storage: The facility uses a variety of liquid and solid chemicals including: sodium hypochlorite, ferric sulfate, powdered activated carbon, hydrated lime, fluorosilicic acid, orthophosphate, and ammonium hydroxide. The powdered activated carbon and the hydrated lime are stored in silos on the plant grounds. The ferric sulfate and fluorosilicic acid are stored outdoors in bulk storage tanks within containment berms. The sodium hypochlorite, ammonium hydroxide and orthophosphate are stored indoors in bulk storage tanks within containment berms. Diesel fuel for the backup generator is stored outside in an above ground tank with a concrete berm. The facility's topography is such that runoff would be directed to the lagoons.

Sediment not associated with domestic wastewater is generated in the water purification process and settles out in the settling basin. Settling basin sludge and filter backwash is discharged in the sludge lagoon. Wastewater and sludge is mixed in the lagoon and pumped to the sanitary sewer for treatment at Falling Creek WWTP (VA0024996). Therefore, under normal operating procedures a discharge is not associated with this facility. The permit is maintained for extraordinary circumstances when discharge to the municipal system is prevented. No discharge occurred in the five-year cycle of the 2006 permit.

13. Ambient Water Quality Information:

In the 2010 Assessment, the segment was assessed as a Category 5A water ("A Water Quality Standard is not attained. The water is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303d list).") DEQ monitoring confirmed the dissolved oxygen exceedances; therefore the segment was impaired of the Aquatic Life Use. The TMDL is due in 2022. The other designated uses remain unassessed.

Ambient stream data for the outfall location was not available as this section of Swift Creek is intermittent and often dry.

14. Antidegradation Review & Comments:

Tier: 1   X   2        3       

The State Water Control Board's Water Quality Standards includes an antidegradation policy (9VAC25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with a Tier determination. Due to the withdrawals by the County from Swift Creek Reservoir, and to an agreement between the County and the landowners immediately adjacent to Swift Creek Reservoir, Swift Creek has the potential to go dry immediately downstream of the reservoir during periods of low flow. Due to the lack of release from the dam during low flow events, the stream is considered a Tier 1 water at the vicinity of the outfall.

15. Site Inspection: Date 1/10/2008 Performed by: Meredith Williams  
Attachment B- Site Visit Report

16. Effluent Screening & Limitation Development:

Due to the fact that this facility, under normal operating procedures, does not discharge, there was no DMR data available for the permit term. Only analytical data submitted with the application could be considered. Samples were taken directly from the sludge lagoon for the purposes of analysis for the permit application. The outfall discharges to a segment of Swift Creek that is often dry due to withdrawals from Swift Creek reservoir and ambient monitoring data was not available. Numeric permit limitation calculations utilize conservative low flow ambient conditions to represent circumstances in which the effluent has the greatest potential to impact the receiving stream. This facility must meet end of pipe limits as it discharges to a dry ditch and no mixing occurs; therefore, stream information and effluent information is identical in MSTRANTI. In the absence of hardness data, the most conservative value of 25 mg/L CaCO<sub>3</sub> was used. The maximum average temperature value (29.7°C) from Form 2C was assumed to be a reasonable approximation of the 90<sup>th</sup> percentile stream/effluent temperature. Likewise, the reported pH of 6.3 was used as a reasonable approximation of the 90<sup>th</sup> percentile stream/effluent pH. Due to the end of pipe limits, a 100% mix was assumed. MSTRANTI was used to determine maximum wasteload allocations for each water quality parameter that maintain Water Quality Standards (WQS) in the receiving stream.

Effluent testing reported on EPA Form 2C consists of pollutants believed present in the facility's effluent. Measurable concentrations of the pollutants listed in Table II of this fact sheet were observed in the effluent. All other pollutants analyzed were less than the Quantification Level (QL) concentrations, or believed absent. Acceptable QLs were used in these analyses. The pollutants which have an Aquatic Water Quality Standard were evaluated for reasonable potential using STATS.exe. The results of these analyses are included in Attachment E (Stats.exe results). A limit for TRC was required; no limit for ammonia was necessary.

Permit Attachment A, "Water Quality Criteria Monitoring" would normally be required with the application submission for a facility with this flow (0.5 MGD). However, taking into consideration the absence of a discharge under normal circumstances, and previous permitting decisions, it was not compulsory with this application for reissuance. Special requirements for submission of Attachment A are addressed in Part I.B.9 of the permit.

**Table I. Basis for Effluent Limitations:**

PARAMETER	BASIS
Total Suspended Solids (TSS)	Best Engineering Judgement
pH	State Water Quality Standards
Total Residual Chlorine (TRC)	State Water Quality Standards

a. Best Engineering Judgment

TSS: TSS limits of 30 mg/L (monthly average) and 60 mg/L (daily maximum) were utilized in accordance with the January 27, 2010 Water Permit Manual Section IN-5, Part A. 5, "Water Treatment Plants," and consistent with the previous permit cycle. As no federal effluent guidelines currently exist for discharges from water treatment plants, the limitations are based on Best Engineering Judgment.

b. Water Quality Standards/Water Quality-Based

pH: 9 VAC 25-260-50 of the Virginia Water Quality Standards outlines numerical criteria for pH in Class III waters between 6.0 s.u. and 9.0 s.u.

Total Residual Chlorine (TRC): Although application data indicates that TRC concentrations in the effluent were reported as a concentration of 0.01 mg/L, chlorine is a toxic pollutant purposefully introduced into the wastewater. Per GM00-2011, a chlorine limitation was forced using a datum of 20 mg/L. The resulting limitation (0.016 mg/L) is equivalent to the 2006 permit limitation.

Effluent testing reported on EPA Form 2C consists of the following required parameters (Part V-A): Biological Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Organic Carbon (TOC), Total Suspended Solids (TSS), Ammonia, flow, Temperature, and pH. Supplementary parameters that were believed present in the effluent were also reported in Part B. The effluent data is shown in Table II.

**Table II.** Effluent data reported in the permit application (Form 2C).

<b>Pollutant</b>	<b>Value Reported</b>
BOD (mg/L)*	<3
COD (mg/L)*	28
TOC (mg/L)*	11
TSS (mg/L)	80
Ammonia-N (mg/L)	0.45
pH (s.u.)	6.3
TRC (mg/L)	0.01
Color (Color Un)**	80
Fecal Coliform (MPN/100M)	50
Fluoride (mg/L)	0.94
Nitrate-Nitrite (as N) (mg/L)	<0.1
TON (as N) (mg/L)	0.59
Total Phosphorus (mg/L)	0.048
Sulfate (as SO <sub>4</sub> ) (mg/L)	38
Aluminum, Total (mg/L)	0.046
Iron, Total (mg/L)	4.3
Manganese, Total (mg/L)	0.68

\*BOD, COD, and TOC are oxygen demanding parameters. In DEQ's Best Engineering Judgment (BEJ) these parameters do not exert a notable oxygen demand on the receiving waters and are therefore not limited. Federal secondary treatment guideline limits for municipal wastewater plants for BOD<sub>5</sub> are 30 mg/L (monthly average) and 45 mg/L (7-day average). Therefore the reported BOD value of <3 mg/L for this effluent does not elicit water quality concerns.

\*\*Color is a cosmetic and aesthetic parameter and does not represent a human health concern. The EPA's National Secondary Drinking Water Regulations state a standard of 15 color units for drinking water, although these are non-mandatory standards, created as guidelines to assist public water systems in managing their drinking water for aesthetic parameters. Water with a color rating of 5 color units means the water color is equal to the intensity of distilled water containing 5 milligrams of platinum as potassium chloroplatinate per liter. The color of the effluent in this case may be due to a variety of sources. Anthracite filters are used at the Water Treatment Plant and may contribute a dark color to the effluent during the backwashing process. Similarly the use of ferric sulfate and hydrated lime among other chemical additions throughout the treatment process likely contribute to the color of effluent in the lagoon.

Ambient water quality data for the Appomattox River Station 2-APP001.53 near the City of Hopewell was examined to determine ambient water color. The average color was 78 color units, but values as high as 233 color units were recorded for the river. The color of the effluent is a byproduct of the treatment process and does not pose a human health concern and is not uncommonly high as compared to ambient color conditions in the Appomattox River. As such, it is in DEQ's BEJ that color does not require further evaluation.

All data reported in the permit renewal application for pollutants for which there are applicable water quality standards were evaluated in regard to compliance with Virginia's Water Quality Standards (aquatic life and/or human health). There are no acute or chronic aquatic life criteria for fluoride, Nitrate-Nitrite, TON, TP, Sulfate, Aluminum, Iron or Manganese, therefore further evaluation with regard to Water Quality Standards was not necessary for these parameters. Fecal coliform limits are not used except for discharges into shellfish waters (per the January 27, 2010 VPDES Permit Manual, Section MN-3); the limit used for shellfish waters is 200 N/100ml. The value reported at this facility is well

below this limit; therefore, it is DEQ's BEJ that the facility does not present a bacteriological water quality concern.

Swift Creek was included in the Appomattox River Basin Bacterial Total Maximum Daily Load (TMDL), which was approved by the EPA on 8/30/2004 and by the State Water Control Board on 12/20/2005. The facility was addressed in the TMDL and assigned a bacterial wasteload allocation; however, the water treatment plant is not expected to contribute additional fecal coliform bacteria to background influent concentrations. A modification to remove the facility from the TMDL was initiated in November 2010. The modification was approved on February 2, 2011 and a bacteria limit is therefore not required.

**Table III. Human Health Evaluation**

<b>Parameter</b>	<b>Expected Value (µg/L)</b>	<b>HH (PWS) Standard (µg/L)</b>
Iron	4,300	300
Manganese	680	50
Sulfate	38,000	250,000
Nitrate (as N)	<100 (Nitrate-Nitrite as N)	10,000

Table III is used for comparative purposes to examine Human Health standards for a public water supply (PWS). The receiving waters for this facility are not a PWS therefore further evaluation of the parameters listed in Table III is not needed as human health standards do not apply.

17. Antibacksliding Statement: No limits have been reduced or removed from this permit.
18. Compliance Schedules: There are no new or more stringent permit limitations proposed in this reissuance; consequently, a compliance schedule is not necessary.
19. Special Conditions:
- B1. O&M Manual Requirement**  
**Rationale:** Required by Code of Virginia § 62.1-44.16; VPDES Permit Regulation, 9VAC25-31-190 E, and 40 CFR 122.41(e). These require proper operation and maintenance of the permitted facility. Compliance with an approved O&M manual ensures this.
- B2. Materials Handling/Storage**  
**Rationale:** 9VAC25-31-50 A prohibits the discharge of any wastes into State waters unless authorized by permit. Code of Virginia §62.1-44.16 and §62.1-44.17 authorize the Board to regulate the discharge of industrial waste or other waste.
- B3. Notification Levels**  
**Rationale:** Required by VPDES Permit Regulation, 9VAC25-31-200 A for all manufacturing, commercial, mining, and silvicultural dischargers.
- B4. Compliance Reporting and Quantification Levels**  
**Rationale:** Authorized by VPDES Permit Regulation, 9VAC25-31-190 J 4 and 220 I. This condition is necessary when pollutants are monitored by the permittee and a maximum level of quantification and/or a specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. The condition also establishes protocols for calculation of reported values.

**B.5 Ground Water Monitoring**

**Rationale:** State Water Control Law § 62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. Ground water monitoring for parameters of concern will indicate whether possible lagoon seepage is resulting in violations of the State Water Control Board's Ground Water Standards.

Groundwater data from March 2006 to September 2010 were analyzed to evaluate potential impacts of the settling lagoons on groundwater. See Attachment G- Groundwater Report and Evaluation for a detailed discussion.

Historical data indicates an increasing trend in sulfate contamination at MW-3, the up-gradient well. Ferric sulfate is added to the raw water in the flash mixer, prior to primary and secondary settling. MW-3 is located next to the settling basins, an indication that the basins may be the source of sulfate contamination. The revised groundwater monitoring plan shall be designed to determine a new, non-impacted, location for the up-gradient well, if feasible.

The permit application reports an effluent ammonia concentration of 0.45 mg/L. The groundwater standard for ammonia is 0.025 mg/L; therefore, it is reasonable to conclude that the settling basin has the potential to contribute to groundwater contamination with regard to ammonia. Similarly, the groundwater standard for color is 15 color units and an effluent color of 80 color units was reported. As such, the permittee is required to add these parameters to the revised groundwater monitoring plan.

An onsite hydrogeologic study to aid in the development of the groundwater monitoring plan is encouraged. Test borehole and piezometers may be drilled to gather information. Boreholes that are not converted into monitoring wells and piezometers shall be sealed with material at least an order of magnitude less permeable than the surrounding soil/sediment/rock. Test borehole logs and reports should be submitted to DEQ in supplement to the groundwater monitoring plan.

**B6. Total Maximum Daily Load (TMDL) Reopener**

**Rationale:** Section 303(d) of the Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to Section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under section 303 of the Act. This reopener is included in all VPDES permits.

**B7. Closure Plan**

**Rationale:** Code of Virginia § 62.1-44.19 of the State Water Control Law. This condition establishes the requirement to submit a closure plan for the wastewater treatment facility if the treatment facility is being replaced or is expected to close.

**B8. Concept Engineering Report (CER) Special Condition**

**Rationale:** §62.1-44.16 of the Code of Virginia requires industrial facilities to obtain DEQ approval for proposed discharges of industrial wastewater. A CER means a document setting forth preliminary concepts or basic information for the design of industrial wastewater treatment facilities and the supporting calculations for sizing the treatment operations.

**B.9. Water Quality Criteria Monitoring**

**Rationale:** State Water Control Law §62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review

data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, subpart 131.11. To ensure that water quality criteria are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment A of this VPDES permit.

**C. Whole Effluent Toxicity Testing**

**Rationale:** VPDES Permit Regulation, 9 VAC 25-31-210 and 220 I, requires monitoring in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. Monitoring will begin concurrent with commencement of the discharge to Swift Creek.

**Part II, Conditions Applicable to All Permits**

**Rationale:** VPDES Permit Regulation, 9VAC25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

20. NPDES Permit Rating Work Sheet: Total Score 75  
See Attachment F

21. Changes to Permit

**Table I:** Changes to Cover Page:

<b>From:</b>	<b>To:</b>	<b>Reason:</b>
Facility Name: Addison/Evans Water Production and Laboratory Facility (Formerly Swift Creek Water Treatment Plant)	Facility Name: Addison/Evans Water Production and Laboratory Facility	Clarification no longer needed
Owner: Chesterfield County Department of Utilities	Owner: Chesterfield County	More accurate
"In compliance with the provisions..."	"In compliance with the provisions..." Language Update	Boilerplate verbiage revised as per January 27, 2010 VPDES Permit Manual, Section IN-1.
Deputy Director, Department of Environmental Quality	Water Permit Manager, Piedmont Regional Office	Water Permit Manager will sign



**Table II:** Changes to Part I A.:

Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason	Date
	From	To	From	To		
Flow- Sample Type	NA	NA	NA	NA	From: Measured To: Estimate Reason: VPDES Permit Manual IN-5 BEJ (1/27/2010)	10/27/2010
TSS	NA	NA	30.0/ 60.0 mg/L	30/60 mg/L	Two significant digits, GM06-2016	10/27/2010
Footnote "NL"	NA	NA	NA	NA	Wording clarified to include reporting as a requirement in addition to monitoring	10/27/2010
Footnote a.	NA	NA	NA	NA	Added for clarity, GM10-2003	10/27/2010
Footnote b.	NA	NA	NA	NA	Added for clarity	10/27/2010

**Table III:** Changes to Part I. B. and C:

From:	To:	Reason:
Part I B.1. Operation and Maintenance Manual Requirement	Part I B.1. Operation and Maintenance Manual Requirement	Language revised to reflect January 27, 2010 VPDES Permit Manual Section IN-3
Part I B.2. Materials Handling/Storage	Part I B.2. Materials Handling/Storage	Language revised to reflect January 27, 2010 VPDES Permit Manual Section IN-3
Part I.B.3. Notification Levels a. (1), (2), b. (1) and (2)	Part I.B.3. Notification Levels a. (1), (2), b. (1) and (2)	DEQ PRO permit writer convention; numerical citations added for clarity
Part I B.4. Compliance Reporting and Quantification Levels a.-d.	Part I B.4. Compliance Reporting and Quantification Levels a.-d.	Language revised to reflect January 27, 2010 VPDES Permit Manual Section IN-3
B.5. Groundwater Monitoring	B.5. Groundwater Monitoring	Language updated to reflect the need for a new groundwater monitoring plan based on data review. (Per GM 98-2010 and VPDES Permit Manual IN-3 pg. 17 1/27/2010 edition)
Part I. B.6. NEW/	---	Removed to reflect

From:	To:	Reason:
Chesapeake Bay Nutrient Reopener special condition		GM07-2008 Amendment 2
Part I B.7. TMDL Reopener	Part I B.6. TMDL Reopener	Renumbered due to NEW special condition removal
Part I B.8. Facility Closure Plan	Part I B.7. Facility Closure Plan	Language revised to reflect January 27, 2010 VPDES Permit Manual Section IN-3 and renumbered due to NEW special condition deletion
---	Part I B.8. CER Permit Special Condition	Added to reflect current PRO guidance (6/29/2010 PRO VPDES staff meeting decision)
Part I B.9. WQ Criteria Monitoring	Part I B.9. WQ Criteria Monitoring	Language revised to reflect January 27, 2010 VPDES Permit Manual.
Part I C. 1.and 2. WET Special Condition	Part I. C. 1.-7. WET Special Condition	Language revised per 2010 D. DeBiasi guidance.

22. Variances/Alternate Limits or Conditions: None

23. Public Notice Information required by 9VAC25-31-280 B:

Comment period: Publishing Newspaper: *Richmond Times-Dispatch*  
Publishing Dates: 3/1/2011 and 3/8/2011  
Start Date: 3/1/2011 End Date: 4/1/2011

All pertinent information is on file and may be inspected or copied by contacting Janine Howard at:

Piedmont Regional Office  
4949-A Cox Road  
Glen Allen, VA 23060  
t: (804) 527-5046  
f: (804) 527-5106  
[janine.howard@deq.virginia.gov](mailto:janine.howard@deq.virginia.gov)

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific

references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit. The public may review the draft permit and application at the DEQ office named above by appointment or may request copies of the documents from the contact person listed above.

#### 24. Additional Comments:

##### Planning Statement:

The discharge is not addressed in any planning document but will be included when the plan is updated.

##### Previous Board Action: None

Threatened and Endangered Species Coordination: As required by the 2007 Memorandum of Agreement (MOU) between VDEQ, VDGI (Virginia Department of Game and Inland Fisheries), VDCR (Virginia Department of Conservation and Recreation), and USFWS (United States Fish and Wildlife Service), a threatened and endangered species screening was conducted for this permit reissuance. The T&E review was performed in accordance with GM 07-2007. A request for review was submitted to DCR via the Natural Heritage Explorer webpage and a report was generated on 10/26/2010. The report indicated that "Natural heritage resources have been documented within two miles of the indicated project boundaries."

A follow-up letter dated November 19, 2010 was received from DCR. The letter stated that the project is located within the Swift Creek Reservoir Conservation unit (SCU) and that the Yellow Lance (*Elliptio lanceolata*) is a natural heritage resource of concern associated with the SCU due to population decline. The species is classed as a species of concern by the U.S. Fish and Wildlife Service and a special concern species with VDGI, however these designations have no legal status. The letter stated that DCR is in support of a no mixing zone and recommended the use of UV/ozone to replace chlorination disinfection and utilization of new technologies as they become available to improve water quality.

No mixing zone is given in this permit. The facility discharges to a dry ditch and end of pipe limits are in effect. DEQ will forward the concerns regarding the use of UV disinfection rather than chlorination to the owner for their consideration. DEQ reevaluated the need for chlorine limits at this permit reissuance using the current water quality criterion, and calculated limits accordingly.

A T&E species screening was conducted using VDGI's Fish and Wildlife Service for aquatic species. The screening revealed no confirmed hits for Federal endangered, Federal threatened, State endangered, or State threatened species within a two mile radius of the outfall.

See **Attachment F** for DGIF and DCR reports.

##### Nutrients Requirements:

This facility is not subject to 9 VAC 25-820-10 et seq. General VPDES Watershed Permit Regulation for Total Nitrogen and Total Phosphorus Discharges and Nutrient Trading in the Chesapeake Bay Watershed in Virginia. This facility is not considered a significant discharger of nutrients to the Chesapeake Bay per the definition of "significant discharger" established in 9 VAC 25-720; the facility does not discharge a nutrient loading equivalent to a 500,000 gallon per day (gpd) municipal facility. Total Nitrogen (TN) and Total Phosphorus (TP) concentrations at municipal facilities considered representative of secondary treatment are 18.7 mg/L and 2.5 mg/L. These numbers correspond with a loading of 28,462 lbs/year TN and 3,805 lbs/year TP for a 500,000 gallon per day (significant) municipal discharger.

Although this facility is permitted for a 500,000 gpd, it does not discharge a nutrient load equivalent to the above-referenced numbers. A TP concentration value for the effluent taken from the reissuance application submitted in 2004 of 0.008 mg/L would result in an annual TP load of 12 lbs/year at the 500,000 gpd permitted design capacity. Total Nitrogen is not traditionally monitored or reported on the application for this facility therefore an estimate of TN loading is not possible; however, considering the 2004 reported value for Nitrate-Nitrite (as N) of less than 0.01 mg/L in the effluent, it is reasonable to conclude that the TN load of this facility does not correspond to that of a significant discharger as defined above. As the facility has not proposed an expansion or upgrade to the wastewater treatment facilities at this time, further evaluation of nutrients is not necessary.

Staff Comments:

- a. Whole Effluent Toxicity (WET) testing was not required as part of the application for the facility as it has not to date ever discharged. Upon commencement of a discharge the facility is required per Part I.C. of the permit to submit WET test results. The WET test special condition (Part I.C.) is carried forward per the active permit, however the special condition language has been updated per Central Office guidance. See Attachment H for the WET Testing Review Memo and WETLIM10.
- b. Reduced monitoring has not been applied for this facility. In accordance with the January 27, 2010 VPDES Permit Manual Section IN-2, Part D.5.e.(1) reduced monitoring is not appropriate for this facility due to the discontinuous nature of the discharge.
- c. The 2010 annual permit maintenance fees for this facility have been paid.
- d. EPA has waived the right to comment and/or object to the adequacy of the draft permit.
- e. By letter dated October 21, 2010 the Virginia Department of Health stated that they had no objections to the permit reissuance.
- f. This discharge is not controversial and is currently meeting the required effluent limitations.
- g. The permittee is not a VEEP member.
- h. This permittee has been notified of DEQ's intent to require e-DMR participation as of 9/3/2010.
- i. This facility is not subject to coverage under the VPDES Industrial Storm Water General permit VAR05 (authorized by 9 VAC 25-151).

Public Notice Comments: No comments were received during the public notice period.

Other Agency Comments:

The VDH Office of Drinking Water reviewed the reissuance application and by letter dated October 21, 2010 stated:

- VPDES Permit No. VA0006254 is for discharges from the WTP sludge lagoon. The lagoon effluent is normally pumped into the Chesterfield County sewer system. It is discharged to Swift Creek only when the lagoon overflows from heavy rain.
- The head of Swift Creek Lake, located in Pocahontas State Park, is approximately 6.1 miles downstream of the existing discharge point. The lake is used for recreational boating.
- The raw water intake for the Virginia American-Hopewell water treatment plant, located on the Appomattox River near its confluence with the James River, is approximately 34.7 miles downstream of the existing discharge point.

25. 303(d) Listed Segments (TMDL): Swift Creek was included in the Appomattox River Basin Bacterial TMDL, which was approved by the EPA on 8/30/2004 and by the SWCB on

12/20/2005. The water treatment plant is not expected to contribute additional fecal coliform bacteria to background influent levels, a TMDL modification to remove the facility from the TMDL was initiated in November 2010. The TMDL modification was approved on February 2, 2011; therefore, bacterial limits do not apply to this facility.

In the 2010 Assessment, the segment was assessed as a Category 5A water ("A Water Quality Standard is not attained. The water is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303d list).") DEQ monitoring confirmed the dissolved oxygen exceedances therefore the segment was impaired of the Aquatic Life Use. The TMDL is due in 2022. The other designated uses remain unassessed.

26. Attachments:

Attachment A: Flow Frequency Analysis  
Attachment B: Site Visit Report  
Attachment C: Plant Flow Diagram  
Attachment D: Topographic Map- Halsboro USGS Quadrangle 100B  
Attachment E: MSTRANTI results; data source for MSTRANTI; Stats.exe  
Attachment F: Threatened and Endangered Species Coordination (DGIF, DCR)  
Attachment G: Groundwater Report and Evaluation  
Attachment H: WET Testing Review Memo, WETLIM10  
Attachment I: NPDES Permit Rating Worksheet

## **Attachment A- Flow Frequency Memo**

# MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY  
Piedmont Regional Office  
4949-A Cox Road Glen Allen, Virginia 23060

---

**SUBJECT:** Flow Frequency Determination / 303(d) Status  
Addison Evans Water Treatment Plant – VA0006254

**TO:** Janine Howard

**FROM:** Jennifer Palmore, P.G.

**DATE:** October 19, 2010

**COPIES:** File

Chesterfield County's Addison Evans Water Treatment Plant (WTP) discharges to Swift Creek directly below the Swift Creek Reservoir dam. The discharge is located at river mile 2-SFT030.73. Flow frequencies have been requested at this site for use in developing effluent limitations for the VPDES permit.

Due to the withdrawals by the County from Swift Creek Reservoir, and due to an agreement between the County and the landowners immediately adjacent to Swift Creek Reservoir, Swift Creek has the potential to go dry immediately downstream of the reservoir during periods of low flow. The flow frequencies are presented below.

**Swift Creek at discharge point**

Drainage Area = 65 mi<sup>2</sup>

1Q30 = 0.0 cfs	High Flow 1Q10 = 0.0 cfs
1Q10 = 0.0 cfs	High Flow 7Q10 = 0.0 cfs
7Q10 = 0.0 cfs	High Flow 30Q10 = 0.0 cfs
30Q10 = 0.0 cfs	HM = 0.0 cfs
30Q5 = 0.0 cfs	

This analysis does not address any other withdrawals, discharges, or springs.

During the 2008 305(b)/303(d) Water Quality Assessment, Swift Creek from the Swift Creek Reservoir dam downstream to Reedy Creek was assessed as a Category 2B water ("Waters are of concern to the state but no Water Quality Standard exists for a specific pollutant, or the water exceeds a state screening value or toxicity test.") The Aquatic Life Use was considered fully supporting with observed effects due to possible dissolved oxygen exceedances. The Recreation-, Fish Consumption-, and Wildlife Uses were not assessed.

In the draft 2010 Assessment, the segment was assessed as a Category 5A water ("A Water Quality Standard is not attained. The water is impaired or threatened for one or more designated uses by a pollutant(s) and requires a TMDL (303d list).") DEQ monitoring confirmed the dissolved oxygen exceedances therefore the segment was impaired of the Aquatic Life Use. The TMDL is due in 2022. The other designated uses remain unassessed.

Swift Creek was included in the Appomattox River Basin Bacterial TMDL, which was approved by the EPA on 8/30/2004 and by the SWCB on 12/20/2005. As the water treatment plant is not expected to be a source of additional fecal bacteria, the facility was not addressed in the TMDL.

Due to the lack of release from the dam during low flow events, the stream is considered a Tier 1 water at the vicinity of the outfall.

If you have any questions concerning this analysis, please let me know.



## **Attachment B- Site Visit Report**

# VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY

## Piedmont Regional Office WASTEWATER FACILITY INSPECTION REPORT

<b>FACILITY NAME:</b>	<u>Addison-Evans Water Production &amp; Laboratory Facility</u>	<b>INSPECTOR:</b>	<u>Heather Horne</u>
<b>PERMIT No.:</b>	<u>VA0006254</u>	<b>INSPECTION DATE:</b>	<u>January 10, 2008</u>
<b>TYPE OF FACILITY:</b>	<u>Industrial - Minor</u>	<b>REPORT COMPLETED:</b>	<u>January 17, 2008</u>
<b>COUNTY/CITY:</b>	<u>Chesterfield County</u>	<b>UNANNOUNCED INSPECTION:</b>	<u>YES</u>
<b>REVIEWED BY:</b>			
<b>PRESENT DURING INSPECTION:</b>	<u>Meredith Williams, DEQ; George DuVal, plant manager;</u> <u>David Sirois, lab manager</u>		

### ***I. OPERATIONAL UNIT REVIEW AND CONDITION:***

**Sludge Lagoon** – The treatment lagoon is divided into three separate unlined divisions. At the time of the inspection, freeboard was approximately 3 feet.

Six mechanical mixers are located in the southeast section of the lagoon to suspend wastewater solids for pumping to the County's sanitary sewer. All process water from the water treatment plant (settling basin washwater and filter backwash) is piped to this section of the lagoon. Wastewater discharges from this section via a gate valve in an effluent chamber that is located at the southern end of the catwalk. A float switch in the chamber controls wastewater pumping to the sewerage system. Two submersible pumps operating alternately pump water to the sewerage system. The pump float system has a high water level audio alarm.

The other two sections of the lagoon (northern and southwestern) are used as back up for overflow conditions. At the time of inspection, there was water in these sections because the facility dropped the main settling basin for temporary maintenance. The plant regularly drops the settling basins twice per year to clean. Two manual pumps are maintained on the far side of lagoon (other side of divider) to use if necessary. Wastewater in the northern and southwestern sections is pumped via two flexible hoses to two connections with the sanitary sewer. The old outfall 001 that originally discharged to the canal was sealed with concrete. This facility does not discharge to the adjacent receiving stream (Swift Creek). Some vegetation, including small trees, was noted along the northern berm.

**Groundwater Monitoring** – The WTP personnel monitor three groundwater wells. In accordance with the plant's groundwater monitoring numbering scheme, well #1 is located in the southwest corner, well #2 is located in the northwest corner near the canal, and well #3, the upgradient or reference well, is located near the settling basins.

### ***II. ULTIMATE DISPOSAL OF SOLIDS:***

Solids are pumped from the lagoon to the County sewerage system. The lagoon has never been dredged.

### ***III. FIELD DATA:***

<b>Flow:</b>	<u>N/A</u> MGD	<b>Dissolved Oxygen:</b>	<u>    </u> mg/L	<b>Contact Chlorine Res.:</b>	<u>    </u> mg/L
<b>pH:</b>	<u>    </u> S.U	<b>Final Chlorine Res.:</b>	<u>    </u> mg/L	<b>Temperature:</b>	<u>    </u> °C
<b>Calibration</b>	N/A				
<b>Time/Initials/documentation:</b>					
<b>Condition of Effluent:</b>	No discharge				
<b>Condition of Receiving Stream:</b>	Facility does not discharge to Swift Creek.				
<b>Samples Collected during the inspection:</b>	None – no discharge				

**IV. PLANT OPERATIONS AND MAINTENANCE:**

<b>Operations and Maintenance Manual:</b>	Not required until become a discharging facility
<b>Class and Number of Licensed Operators:</b>	N/A
<b>Alarm Systems and Alternate Power:</b>	High water level alarm (audio) on lagoon; generator on-site
<b>Any bypassing since last inspection?</b>	N/A
<b>When was the RPZ device last checked?</b>	N/A
<b>Name, number and description of pump stations:</b>	N/A

**IV. COMMENTS:**

Several letters are contained in the file from Mr. DuVal stating after significant storm events, Swift Creek flooded over the berm into the WTP sludge lagoon. When this occurs, which has been documented in the past, all lagoon pumps and mixers are stopped prior to lagoon flooding and not restarted until after the flood waters recede and are below the lagoon bank. Mr. DuVal stated flood waters rise slowly over a distance before entering the lagoon. The facility utilizes ferric sulfate which creates a heavy sludge. During flood events mixers are turned off, so the sludge settles and therefore does not discharge. The facility stated that after Hurricane Isabel, flooding at the facility worsened due to trees in the stream channel. The facility has spent significant funds to remove trees and has plans to further improve the riparian zone to alleviate flooding. The facility is obtaining the proper permits to conduct this work.

**V. GENERAL RECOMMENDATIONS:**

1. Continue to monitor vegetation and berm integrity along the north side of the sludge lagoon. Tree roots of significant size can cause berm failure. Tall vegetation also has a tendency to attract burrowing animals which can affect the integrity of the berm.

**VI. COMPLIANCE RECOMMENDATIONS/REQUEST FOR CORRECTIVE ACTION:**

None at this time.

Digital Photographs Sheet

Date Photographs Taken: January 10, 2008



Photograph 1: Mechanical mixers in southeast cell



Photograph 2: Southwest cell



Photograph 3: Flexible- pipe to sanitary sewer



Photograph 4: Northern cell (old influent pipe in foreground)



Photograph 5: Vicinity of Outfall 001



Photograph 6: Old discharge weir (now filled with concrete)

January 23, 2008

Mr. Roy E. Covington, P.E.  
Assistant Director of Utilities  
Chesterfield County Department of Utilities  
P.O. Box 608  
Chesterfield, VA 23832

RE: Addison-Evans Water Production and Laboratory Facility, VA0006254-Inspection Report

Dear Mr. Covington:

Enclosed is your copy of the Wastewater Facility Inspection Report conducted at the Addison-Evans Water Production and Laboratory Facility on January 10, 2008. Overall, the facility was found to be in good condition. The facility does not discharge to Swift Creek and all wastewater is pumped to the sanitary sewer. There are no compliance recommendations at this time; therefore, no further response from you is necessary.

Also enclosed is your copy of the Laboratory Inspection Report. No compliance recommendations were noted at this time; therefore, no further response from you is necessary.

Please extend our thanks to Mr. George DuVal and Mr. David Sirois for the time and courtesy extended to us during this unannounced inspection. Should you have any questions regarding the reports, please contact me at (804) 527-5064.

Sincerely,

Heather A. Horne  
Environmental Inspector

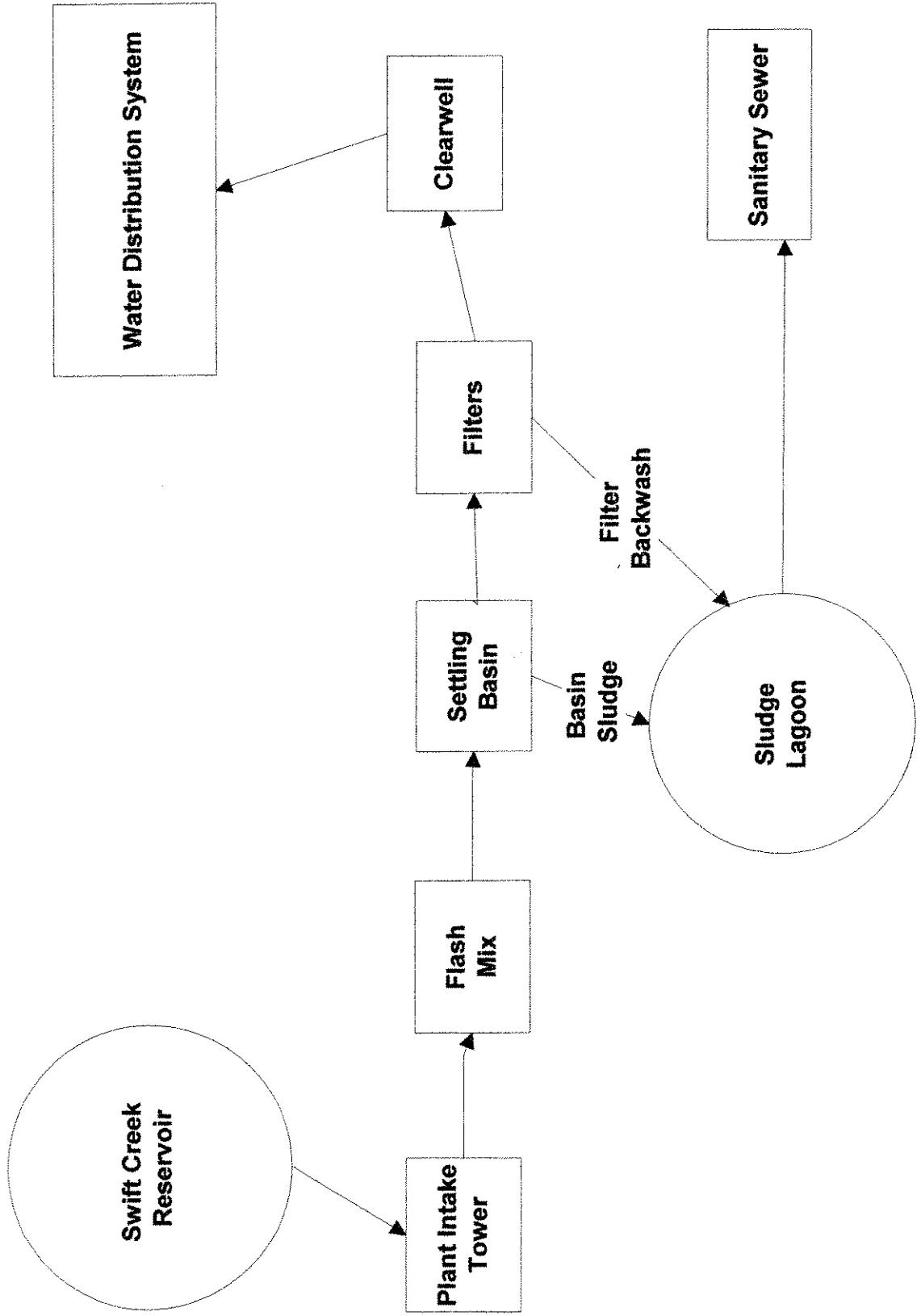
Attachments

cc: DEQ – PRO file

Mr. George DuVal, Addison-Evans WPLF

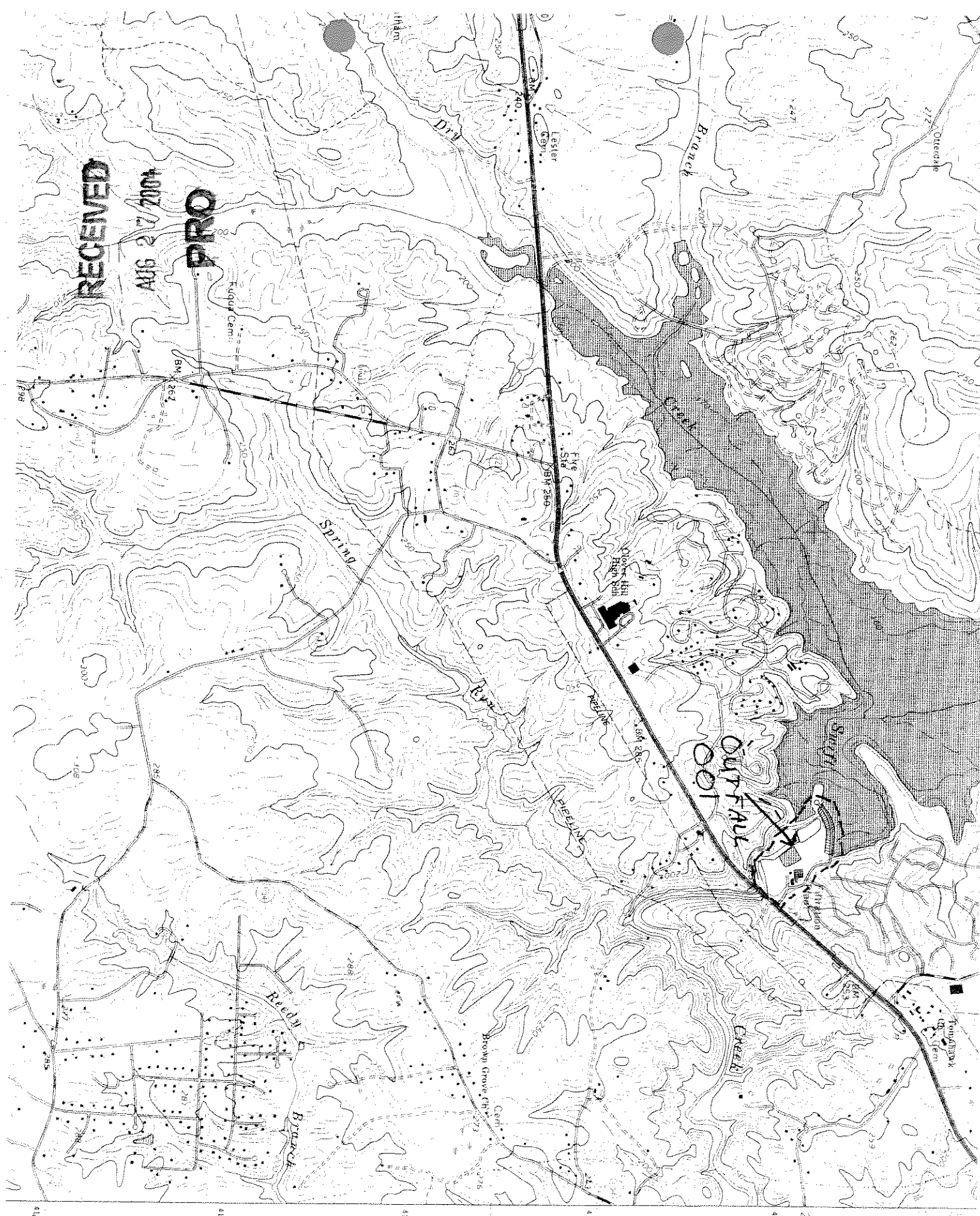
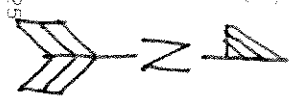
## **Attachment C- Plant Flow Diagram**

# ADDISON/EVANS WATER PRODUCTION AND LABORATORY FACILITY



**Attachment D- Topographic Map USGS Halsboro Quadrangle (#100B)**





RECEIVED  
AUG 27 2104  
PRO

001  
002  
003  
004  
005  
006  
007  
008  
009  
010  
011  
012  
013  
014  
015  
016  
017  
018  
019  
020  
021  
022  
023  
024  
025  
026  
027  
028  
029  
030  
031  
032  
033  
034  
035  
036  
037  
038  
039  
040  
041  
042  
043  
044  
045  
046  
047  
048  
049  
050  
051  
052  
053  
054  
055  
056  
057  
058  
059  
060  
061  
062  
063  
064  
065  
066  
067  
068  
069  
070  
071  
072  
073  
074  
075  
076  
077  
078  
079  
080  
081  
082  
083  
084  
085  
086  
087  
088  
089  
090  
091  
092  
093  
094  
095  
096  
097  
098  
099  
100

**Attachment E- MSTRANTI data source report, MSTRANTI, Stats.exe results**

## MSTRANTI DATA SOURCE REPORT

Stream information	
Mean Hardness	Default value
90% Temperature (annual)*	Same as Effluent
90% Temperature (wet season)*	Not Applicable
90% Maximum pH	Same as Effluent
10% Maximum pH	Not Applicable
Tier Designation	Tier Determination
Stream Flows	
All Data	Not Applicable- Dry ditch conditions
Mixing Information	
All Data	Standard 100% for 0 flows.
Effluent Information	
Mean Hardness	Default value
90% Temperature (annual)	Permit Application Form 2C,V,Part A.1.h
90% Maximum pH	Permit Application Form 2C,V,Part A.1.i
10% Maximum pH	Not Applicable
Discharge flow	Permit Application

Data Location:

Flow Frequency Description – Attachment A

\*Note: The effluent temperature reported in the permit renewal application 29.7 °C summer is taken to be a reasonable approximation of the 90% annual temperature. Likewise, the pH reported (6.3 S.U.) is taken to be a reasonable approximation of the 90% maximum pH.

# FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Addison/Evans WTP

Permit No.: VA0006254

Receiving Stream: Swift Creek

Version: OWP Guidance Memo 00-2011 (8/24/00)

## Stream Information

Mean Hardness (as CaCO3) =	25 mg/L
90% Temperature (Annual) =	29.7 deg C
90% Temperature (Wet season) =	deg C
90% Maximum pH =	6.3 SU
10% Maximum pH =	SU
Tier Designation (1 or 2) =	1
Public Water Supply (PWS) Y/N? =	n
Trout Present Y/N? =	n
Early Life Stages Present Y/N? =	y

## Stream Flows

1Q10 (Annual) =	0 MGD
7Q10 (Annual) =	0 MGD
30Q10 (Annual) =	0 MGD
1Q10 (Wet season) =	0 MGD
30Q10 (Wet season) =	0 MGD
30Q5 =	0 MGD
Harmonic Mean =	0 MGD

## Mixing Information

Annual - 1Q10 Mix =	100 %
- 7Q10 Mix =	100 %
- 30Q10 Mix =	100 %
Wet Season - 1Q10 Mix =	100 %
- 30Q10 Mix =	100 %

## Effluent Information

Mean Hardness (as CaCO3) =	25 mg/L
90% Temp (Annual) =	29.7 deg C
90% Temp (Wet season) =	deg C
90% Maximum pH =	6.3 SU
10% Maximum pH =	SU
Discharge Flow =	0.5 MGD

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	9.9E+02	--	--	na	9.9E+02	--	--	--	--	--	--	--	--	--	--	na	9.9E+02
Acrolein	0	--	--	na	9.3E+00	--	--	na	9.3E+00	--	--	--	--	--	--	--	--	--	--	na	9.3E+00
Acrylonitrile <sup>C</sup>	0	--	--	na	2.5E+00	--	--	na	2.5E+00	--	--	--	--	--	--	--	--	--	--	na	2.5E+00
Aldrin <sup>C</sup>	0	3.0E+00	--	na	5.0E-04	3.0E+00	--	na	5.0E-04	--	--	--	--	--	--	--	--	3.0E+00	--	na	5.0E-04
Ammonia-N (mg/l) (Yearly)	0	5.20E+01	2.56E+00	na	--	5.2E+01	2.6E+00	na	--	--	--	--	--	--	--	--	--	5.2E+01	2.6E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	5.20E+01	6.82E+00	na	--	5.2E+01	6.8E+00	na	--	--	--	--	--	--	--	--	--	5.2E+01	6.8E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	4.0E+04	--	--	--	--	--	--	--	--	--	--	na	4.0E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	6.4E+02	--	--	--	--	--	--	--	--	--	--	na	6.4E+02
Arsenic	0	3.4E+02	1.5E+02	na	--	3.4E+02	1.5E+02	na	--	--	--	--	--	--	--	--	--	3.4E+02	1.5E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene <sup>C</sup>	0	--	--	na	5.1E+02	--	--	na	5.1E+02	--	--	--	--	--	--	--	--	--	--	na	5.1E+02
Benzidine <sup>C</sup>	0	--	--	na	2.0E-03	--	--	na	2.0E-03	--	--	--	--	--	--	--	--	--	--	na	2.0E-03
Benzo (a) anthracene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (b) fluoranthene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (k) fluoranthene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Benzo (a) pyrene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Bis2-Chloroethyl Ether <sup>C</sup>	0	--	--	na	5.3E+00	--	--	na	5.3E+00	--	--	--	--	--	--	--	--	--	--	na	5.3E+00
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	6.5E+04	--	--	--	--	--	--	--	--	--	--	na	6.5E+04
Bis 2-Ethylhexyl Phthalate <sup>C</sup>	0	--	--	na	2.2E+01	--	--	na	2.2E+01	--	--	--	--	--	--	--	--	--	--	na	2.2E+01
Bromoform <sup>C</sup>	0	--	--	na	1.4E+03	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
Cadmium	0	8.2E-01	3.8E-01	na	--	8.2E-01	3.8E-01	na	--	--	--	--	--	--	--	--	--	8.2E-01	3.8E-01	na	--
Carbon Tetrachloride <sup>C</sup>	0	--	--	na	1.6E+01	--	--	na	1.6E+01	--	--	--	--	--	--	--	--	--	--	na	1.6E+01
Chlordane <sup>C</sup>	0	2.4E+00	4.3E-03	na	8.1E-03	2.4E+00	4.3E-03	na	8.1E-03	--	--	--	--	--	--	--	--	2.4E+00	4.3E-03	na	8.1E-03
Chloride	0	8.6E+05	2.3E+05	na	--	8.6E+05	2.3E+05	na	--	--	--	--	--	--	--	--	--	8.6E+05	2.3E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.9E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.9E+01	1.1E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	--	--	na	1.6E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane <sup>C</sup>	0	--	--	na	1.3E+02	--	--	na	1.3E+02	--	--	--	--	--	--	--	--	--	--	na	1.3E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	1.6E+03	--	--	--	--	--	--	--	--	--	--	na	1.6E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	--	--	na	1.5E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	8.3E-02	4.1E-02	na	--	--	--	--	--	--	--	--	--	8.3E-02	4.1E-02	na	--
Chromium III	0	1.8E+02	2.4E+01	na	--	1.8E+02	2.4E+01	na	--	--	--	--	--	--	--	--	--	1.8E+02	2.4E+01	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.6E+01	1.1E+01	na	--	--	--	--	--	--	--	--	--	1.6E+01	1.1E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene <sup>C</sup>	0	--	--	na	1.8E-02	--	--	na	1.8E-02	--	--	--	--	--	--	--	--	--	--	na	1.8E-02
Copper	0	3.6E+00	2.7E+00	na	--	3.6E+00	2.7E+00	na	--	--	--	--	--	--	--	--	--	3.6E+00	2.7E+00	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	2.2E+01	5.2E+00	na	1.6E+04	--	--	--	--	--	--	--	--	2.2E+01	5.2E+00	na	1.6E+04
DDD <sup>C</sup>	0	--	--	na	3.1E-03	--	--	na	3.1E-03	--	--	--	--	--	--	--	--	--	--	na	3.1E-03
DDE <sup>C</sup>	0	--	--	na	2.2E-03	--	--	na	2.2E-03	--	--	--	--	--	--	--	--	--	--	na	2.2E-03
DDT <sup>C</sup>	0	1.1E+00	1.0E-03	na	2.2E-03	1.1E+00	1.0E-03	na	2.2E-03	--	--	--	--	--	--	--	--	1.1E+00	1.0E-03	na	2.2E-03
Demeton	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.7E-01	1.7E-01	na	--	--	--	--	--	--	--	--	--	1.7E-01	1.7E-01	na	--
Dibenz(a,h)anthracene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	9.6E+02	--	--	--	--	--	--	--	--	--	--	na	9.6E+02
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	1.9E+02	--	--	--	--	--	--	--	--	--	--	na	1.9E+02
3,3-Dichlorobenzidine <sup>C</sup>	0	--	--	na	2.8E-01	--	--	na	2.8E-01	--	--	--	--	--	--	--	--	--	--	na	2.8E-01
Dichlorobromomethane <sup>C</sup>	0	--	--	na	1.7E+02	--	--	na	1.7E+02	--	--	--	--	--	--	--	--	--	--	na	1.7E+02
1,2-Dichloroethane <sup>C</sup>	0	--	--	na	3.7E+02	--	--	na	3.7E+02	--	--	--	--	--	--	--	--	--	--	na	3.7E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	7.1E+03	--	--	--	--	--	--	--	--	--	--	na	7.1E+03
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	1.0E+04	--	--	--	--	--	--	--	--	--	--	na	1.0E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	2.9E+02	--	--	--	--	--	--	--	--	--	--	na	2.9E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane <sup>C</sup>	0	--	--	na	1.5E+02	--	--	na	1.5E+02	--	--	--	--	--	--	--	--	--	--	na	1.5E+02
1,3-Dichloropropene <sup>C</sup>	0	--	--	na	2.1E+02	--	--	na	2.1E+02	--	--	--	--	--	--	--	--	--	--	na	2.1E+02
Dieldrin <sup>C</sup>	0	2.4E-01	5.6E-02	na	5.4E-04	2.4E-01	5.6E-02	na	5.4E-04	--	--	--	--	--	--	--	--	2.4E-01	5.6E-02	na	5.4E-04
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	4.4E+04	--	--	--	--	--	--	--	--	--	--	na	4.4E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	8.5E+02	--	--	--	--	--	--	--	--	--	--	na	8.5E+02
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	1.1E+06	--	--	--	--	--	--	--	--	--	--	na	1.1E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	4.5E+03	--	--	--	--	--	--	--	--	--	--	na	4.5E+03
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	5.3E+03	--	--	--	--	--	--	--	--	--	--	na	5.3E+03
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	na	2.8E+02
2,4-Dinitrotoluene <sup>C</sup>	0	--	--	na	3.4E+01	--	--	na	3.4E+01	--	--	--	--	--	--	--	--	--	--	na	3.4E+01
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	5.1E-08	--	--	--	--	--	--	--	--	--	--	na	5.1E-08
1,2-Diphenylhydrazine <sup>C</sup>	0	--	--	na	2.0E+00	--	--	na	2.0E+00	--	--	--	--	--	--	--	--	--	--	na	2.0E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	8.9E+01	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	8.9E+01
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	2.2E-01	5.6E-02	na	8.9E+01	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	na	8.9E+01
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	2.2E-01	5.6E-02	--	--	--	--	--	--	--	--	--	--	2.2E-01	5.6E-02	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	8.9E+01	--	--	--	--	--	--	--	--	--	--	na	8.9E+01
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	8.6E-02	3.6E-02	na	6.0E-02	--	--	--	--	--	--	--	--	8.6E-02	3.6E-02	na	6.0E-02
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	3.0E-01	--	--	--	--	--	--	--	--	--	--	na	3.0E-01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	2.1E+03	--	--	--	--	--	--	--	--	--	--	na	2.1E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	--	--	na	1.4E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	5.3E+03	--	--	--	--	--	--	--	--	--	--	na	5.3E+03
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	1.0E-02	na	--	--	--	--	--	--	--	--	--	--	1.0E-02	na	--
Heptachlor <sup>C</sup>	0	5.2E-01	3.8E-03	na	7.9E-04	5.2E-01	3.8E-03	na	7.9E-04	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	7.9E-04
Heptachlor Epoxide <sup>C</sup>	0	5.2E-01	3.8E-03	na	3.9E-04	5.2E-01	3.8E-03	na	3.9E-04	--	--	--	--	--	--	--	--	5.2E-01	3.8E-03	na	3.9E-04
Hexachlorobenzene <sup>C</sup>	0	--	--	na	2.9E-03	--	--	na	2.9E-03	--	--	--	--	--	--	--	--	--	--	na	2.9E-03
Hexachlorobutadiene <sup>C</sup>	0	--	--	na	1.8E+02	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
Hexachlorocyclohexane																					
Alpha-BHC <sup>C</sup>	0	--	--	na	4.9E-02	--	--	na	4.9E-02	--	--	--	--	--	--	--	--	--	--	na	4.9E-02
Hexachlorocyclohexane																					
Beta-BHC <sup>C</sup>	0	--	--	na	1.7E-01	--	--	na	1.7E-01	--	--	--	--	--	--	--	--	--	--	na	1.7E-01
Hexachlorocyclohexane																					
Gamma-BHC <sup>C</sup> (Lindane)	0	9.5E-01	na	na	1.8E+00	9.5E-01	--	na	1.8E+00	--	--	--	--	--	--	--	--	9.5E-01	--	na	1.8E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	1.1E+03	--	--	--	--	--	--	--	--	--	--	na	1.1E+03
Hexachloroethane <sup>C</sup>	0	--	--	na	3.3E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	--	--	na	3.3E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.0E+00	na	--	--	--	--	--	--	--	--	--	--	2.0E+00	na	--
Indeno (1,2,3-cd) pyrene <sup>C</sup>	0	--	--	na	1.8E-01	--	--	na	1.8E-01	--	--	--	--	--	--	--	--	--	--	na	1.8E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone <sup>C</sup>	0	--	--	na	9.6E+03	--	--	na	9.6E+03	--	--	--	--	--	--	--	--	--	--	na	9.6E+03
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	2.0E+01	2.3E+00	na	--	2.0E+01	2.3E+00	na	--	--	--	--	--	--	--	--	--	2.0E+01	2.3E+00	na	--
Malathion	0	--	1.0E-01	na	--	--	1.0E-01	na	--	--	--	--	--	--	--	--	--	--	1.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	1.4E+00	7.7E-01	--	--	--	--	--	--	--	--	--	--	1.4E+00	7.7E-01	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	1.5E+03	--	--	--	--	--	--	--	--	--	--	na	1.5E+03
Methylene Chloride <sup>C</sup>	0	--	--	na	5.9E+03	--	--	na	5.9E+03	--	--	--	--	--	--	--	--	--	--	na	5.9E+03
Methoxychlor	0	--	3.0E-02	na	--	--	3.0E-02	na	--	--	--	--	--	--	--	--	--	--	3.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	5.6E+01	6.3E+00	na	4.6E+03	5.6E+01	6.3E+00	na	4.6E+03	--	--	--	--	--	--	--	--	5.6E+01	6.3E+00	na	4.6E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	6.9E+02	--	--	--	--	--	--	--	--	--	--	na	6.9E+02
N-Nitrosodimethylamine <sup>C</sup>	0	--	--	na	3.0E+01	--	--	na	3.0E+01	--	--	--	--	--	--	--	--	--	--	na	3.0E+01
N-Nitrosodiphenylamine <sup>C</sup>	0	--	--	na	6.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	--	--	na	6.0E+01
N-Nitrosodi-n-propylamine <sup>C</sup>	0	--	--	na	5.1E+00	--	--	na	5.1E+00	--	--	--	--	--	--	--	--	--	--	na	5.1E+00
Nonylphenol	0	2.8E+01	6.6E+00	--	--	2.8E+01	6.6E+00	na	--	--	--	--	--	--	--	--	--	2.8E+01	6.6E+00	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	6.5E-02	1.3E-02	na	--	--	--	--	--	--	--	--	--	6.5E-02	1.3E-02	na	--
PCB Total <sup>C</sup>	0	--	1.4E-02	na	6.4E-04	--	1.4E-02	na	6.4E-04	--	--	--	--	--	--	--	--	--	1.4E-02	na	6.4E-04
Pentachlorophenol <sup>C</sup>	0	7.7E-03	5.9E-03	na	3.0E+01	7.7E-03	5.9E-03	na	3.0E+01	--	--	--	--	--	--	--	--	7.7E-03	5.9E-03	na	3.0E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	8.6E+05	--	--	--	--	--	--	--	--	--	--	na	8.6E+05
Pyrene	0	--	--	na	4.0E+03	--	--	na	4.0E+03	--	--	--	--	--	--	--	--	--	--	na	4.0E+03
Radionuclides																					
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	--	--	na	4.0E+00
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	2.0E+01	5.0E+00	na	4.2E+03	--	--	--	--	--	--	--	--	2.0E+01	5.0E+00	na	4.2E+03
Silver	0	3.2E-01	--	na	--	3.2E-01	--	na	--	--	--	--	--	--	--	--	--	3.2E-01	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane <sup>C</sup>	0	--	--	na	4.0E+01	--	--	na	4.0E+01	--	--	--	--	--	--	--	--	--	--	na	4.0E+01
Tetrachloroethylene <sup>C</sup>	0	--	--	na	3.3E+01	--	--	na	3.3E+01	--	--	--	--	--	--	--	--	--	--	na	3.3E+01
Thallium	0	--	--	na	4.7E-01	--	--	na	4.7E-01	--	--	--	--	--	--	--	--	--	--	na	4.7E-01
Toluene	0	--	--	na	6.0E+03	--	--	na	6.0E+03	--	--	--	--	--	--	--	--	--	--	na	6.0E+03
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene <sup>C</sup>	0	7.3E-01	2.0E-04	na	2.8E-03	7.3E-01	2.0E-04	na	2.8E-03	--	--	--	--	--	--	--	--	7.3E-01	2.0E-04	na	2.8E-03
Tributyltin	0	4.6E-01	7.2E-02	na	--	4.6E-01	7.2E-02	na	--	--	--	--	--	--	--	--	--	4.6E-01	7.2E-02	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	7.0E+01	--	--	--	--	--	--	--	--	--	--	na	7.0E+01
1,1,2-Trichloroethane <sup>C</sup>	0	--	--	na	1.6E+02	--	--	na	1.6E+02	--	--	--	--	--	--	--	--	--	--	na	1.6E+02
Trichloroethylene <sup>C</sup>	0	--	--	na	3.0E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
2,4,6-Trichlorophenol <sup>C</sup>	0	--	--	na	2.4E+01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	--	--	na	2.4E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride <sup>C</sup>	0	--	--	na	2.4E+01	--	--	na	2.4E+01	--	--	--	--	--	--	--	--	--	--	na	2.4E+01
Zinc	0	3.6E+01	3.6E+01	na	2.6E+04	3.6E+01	3.6E+01	na	2.6E+04	--	--	--	--	--	--	--	--	3.6E+01	3.6E+01	na	2.6E+04

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.  
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic  
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	6.4E+02
Arsenic	9.0E+01
Barium	na
Cadmium	2.3E-01
Chromium III	1.4E+01
Chromium VI	6.4E+00
Copper	1.5E+00
Iron	na
Lead	1.4E+00
Manganese	na
Mercury	4.6E-01
Nickel	3.8E+00
Selenium	3.0E+00
Silver	1.3E-01
Zinc	1.4E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

ammonia.txt

Ammonia Stats.exe

Facility = Addison/Evans WPLF  
Chemical = Ammonia  
Chronic averaging period = 30  
WLAa = 52  
WLAc = 2.6  
Q. L. = .2  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = .45  
Variance = .0729  
C. V. = 0.6  
97th percentile daily values = 1.09503  
97th percentile 4 day average = .748705  
97th percentile 30 day average = .542723  
# < Q. L. = 0  
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

0.45 mg/l

Data source: EPA Form 2C Part V. 1.



trc.txt

TRC Stats.exe

Facility = Addison/ Evans WPLF  
Chemical = TRC  
Chronic averaging period = 4  
WLAa = 0.019  
WLAc = 0.011  
Q. L. = .1  
# samples/mo. = 1  
# samples/wk. = 1

Summary of Statistics:

# observations = 1  
Expected Value = 20  
Variance = 144  
C. V. = 0.6  
97th percentile daily values = 48.6683  
97th percentile 4 day average = 33.2758  
97th percentile 30 day average = 24.1210  
# < Q. L. = 0  
Model used = BPJ Assumptions, type 2 data

A limit is needed based on Chronic Toxicity  
Maximum Daily Limit = 1.60883226245855E-02  
Average Weekly limit = 1.60883226245855E-02  
Average Monthly Limit = 1.60883226245855E-02

The data are:

20 mg/l

limit. In accordance with GM 00-2011, 20 mg/l is used to force a chlorine

**Attachment F- Threatened and Endangered Species Coordination**



# Virginia Department of Game and Inland Fisheries

10/26/2010 10:00:31 AM

## Fish and Wildlife Information Service

**VaFWIS Search Report** Compiled on 10/26/2010, 10:00:31 AM

[Help](#)

 Known or likely to occur within a **2 mile radius of null**

(at 37,24,56.9 -77,38,42.9)

 in **041 Chesterfield County, VA**

 75 Known or Likely Species ordered by Status Concern for Conservation  
 (displaying first 20) (3 species with Status\* or Tier I\*\*)

<u>BOVA Code</u>	<u>Status*</u>	<u>Tier**</u>	<u>Common Name</u>	<u>Scientific Name</u>	<u>Confirmed</u>	<u>Database(s)</u>
060029	FSSS	III	<u>Lance, yellow</u>	Elliptio lanceolata	<u>Yes</u>	Collections,HU6
010077	SS	I	<u>Shiner, bridle</u>	Notropis bifrenatus		BOVA
010032	SS	II	<u>Sturgeon, Atlantic</u>	Acipenser oxyrinchus		BOVA
010038		IV	<u>Alewife</u>	Alosa pseudoharengus		BOVA,HU6
010131		IV	<u>Eel, American</u>	Anguilla rostrata	<u>Yes</u>	Collections,BOVA,HU6
010040		IV	<u>Shad, American</u>	Alosa sapidissima		BOVA,HU6
010179		IV	<u>Sunfish, banded</u>	Enneacanthus obesus		BOVA
060157		IV	<u>Floater, alewife</u>	Anodonta implicata		BOVA
060085		IV	<u>Mussel, eastern pond</u>	Ligumia nasuta		HU6
060176		IV	<u>Spike, Atlantic</u>	Elliptio producta		HU6
010188			<u>Bass, largemouth</u>	Micropterus salmoides		BOVA
010186			<u>Bass, smallmouth</u>	Micropterus dolomieu		BOVA
010168			<u>Bass, striped</u>	Morone saxatilis		BOVA
010183			<u>Bluegill</u>	Lepomis macrochirus	<u>Yes</u>	Collections,BOVA
010034			<u>Bowfin</u>	Amia calva		BOVA
010123			<u>Bullhead, brown</u>	Ameiurus nebulosus		BOVA
010122			<u>Bullhead, yellow</u>	Ameiurus natalis		BOVA
010062			<u>Carp, common</u>	Cyprinus carpio		BOVA

010125			<u>Catfish, channel</u>	Ictalurus punctatus		BOVA
010120			<u>Catfish, white</u>	Ameiurus catus		BOVA

To view **All 75 species** [View 75](#)

\* FE=Federal Endangered; FT=Federal Threatened; SE=State Endangered; ST=State Threatened; FP=Federal Proposed; FC=Federal Candidate; FS=Federal Species of Concern; SC=State Candidate; CC=Collection Concern; SS=State Special Concern

\*\* I=VA Wildlife Action Plan - Tier I - Critical Conservation Need; II=VA Wildlife Action Plan - Tier II - Very High Conservation Need; III=VA Wildlife Action Plan - Tier III - High Conservation Need; IV=VA Wildlife Action Plan - Tier IV - Moderate Conservation Need

[View Map of All Query Results from All Observation Tables](#)

### Anadromous Fish Use Streams

N/A

### Impediments to Fish Passage ( 1 records )

[View Map of All Fish Impediments](#)

ID	Name	River	View Map
1011	SWIFT CREEK RESERVOIR DAM	SWIFT CREEK	Yes

### Colonial Water Bird Survey

N/A

### Threatened and Endangered Waters

N/A

### Cold Water Stream Survey (Trout Streams)

#### Managed Trout Species

N/A

### Scientific Collections ( 4 , 2 Collections with Threatened or Endangered species )

[View Map of All Query Results Scientific Collections](#)

Collection	Date Collected	Collector	Collection Species			View Map
			Different Species	Highest TE *	Highest Tier **	
<a href="#">58933</a>	Oct 8 1999	Jess Jones and Chris Goode, Virginia Cooperative Fish and	5	FSSS	III	<a href="#">Yes</a>

		Wildlife Research Unit, Dept. of Fisheries and Wildlife, Virginia Tech				
<u>63494</u>	Oct 8 1999	Jess Jones and Chris Goode, Virginia Cooperative Fish and Wildlife Research Unit	5	FSSS	III	<u>Yes</u>
<u>11341</u>	Apr 4 1986	NORMAN	9		IV	<u>Yes</u>
<u>35734</u>	Jan 1 1979	DMS-B-SHAMEL	4			<u>Yes</u>

Displayed 4 collections

### Virginia Breeding Bird Atlas Blocks

N/A

### USFWS Breeding Bird Survey Routes

N/A

### Christmas Bird Count Survey

N/A

### Public Holdings:

N/A

### Summary of BOVA Species Associated with Cities and Counties of the Commonwealth of Virginia:

FIPS Code	City and County Name	Different Species	Highest TE	Highest Tier
041	Chesterfield	397	FSST	I

### USGS 7.5' Quadrangles:

Hallsboro

Chesterfield

### USGS NRCS Watersheds in Virginia:

J16 - UPPER SWIFT CREEK/SWIFT CREEK RESERVOIR

J17 - LOWER SWIFT CREEK

### USGS National 6th Order Watersheds Summary of Wildlife Action Plan Tier I, II, III, and IV Species:

HU6 Code	USGS 6th Order Hydrologic Unit	Different Species	Highest TE	Highest Tier
JA41	Swift Creek-Swift Creek Reservoir	57	FSSE	I
JA42	Swift Creek-Third Branch	57	FSST	II

## Terrestrial GAP project

### **17 GAP Habitat types identified within 8096 acres evaluated**

<b>Area</b>	<b>Gap Habitat Type</b>
33%	Virginia Deciduous Forest Complex
17%	Piedmont/Coastal Plain Forest Complex
12%	Open Water
11%	Submontane Yellow Pine
8%	Sparse Herbaceous/Row Crop
5%	High Intensity Developed
3%	Mixed Class/Unknown
3%	Montane Yellow Pine
2%	Mixed Herbaceous
1%	Pasture/Low Herbaceous
1%	Submontane Oak Dominated
1%	Non-Vegetated (mines, barren, etc.)
1%	Herbaceous Wetland
1%	High Herbaceous/Field Crop
<1%	Recent Clear Cut
<1%	Residential/Low Intensity Developed
<1%	Tupelo/Red Maple Wet Forest

### **95 Species designated "Under Represented in Protected Areas" associated with GAP Habitat Types**

### **329 Species associated with GAP Habitat Types**



Department of Conservation & Recreation  
CONSERVING VIRGINIA'S NATURAL & RECREATIONAL RESOURCES

WebID: W634236798204843750

Client Project Number: VA0006254

### *PROJECT INFORMATION*

---

TITLE: Addison/Evans WTP

DESCRIPTION: VPDES permit reissuance

EXISTING SITE CONDITIONS: dry ditch

QUADRANGLES: HALLSBORO

COUNTIES: Chesterfield

Latitude/Longitude (DMS): 372458/773844

Acreage: 1

Comments: Discharge is to a dry ditch therefore there is no mixing zone. Limits will be end-of-pipe to meet water quality standards.

### *REQUESTOR INFORMATION*

---

Priority: No

Tier Level: 2

Tax ID:

Contact Name: Janine Howard

Company Name: DEQ-Piedmont Regional Office

Address: 4949A Cox Road

City: Glen Allen

State: VA

Zip: 23060

Phone: 8045275046

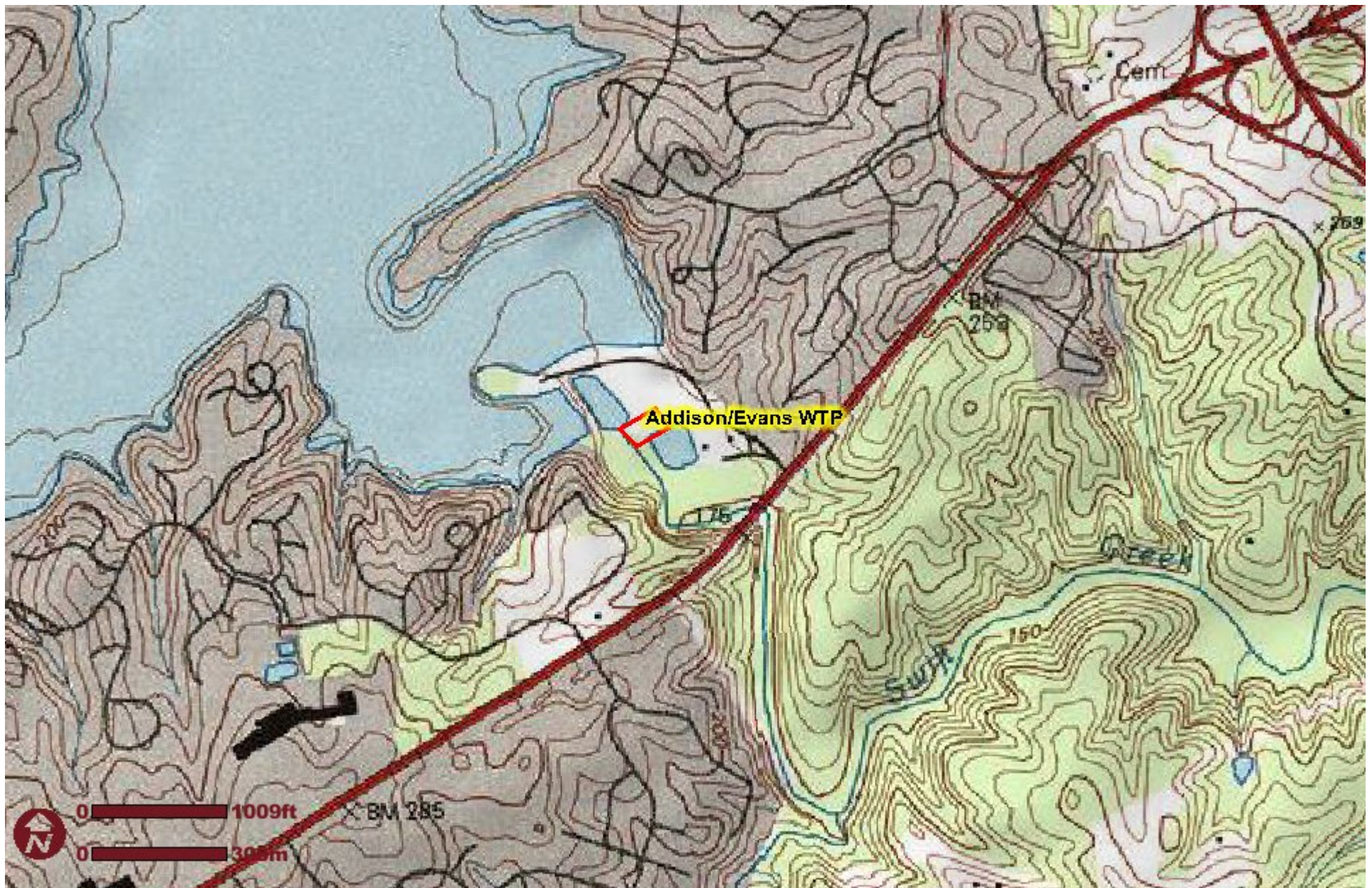
Fax: 8045275106

Email: janine.howard@deq.virginia.gov

Conservation Site Name	Site Type	Brank	Acreage	Listed Species Presence
SWIFT CREEK RESERVOIR SCU	SCU	B3	14	NL
Natural Heritage Conservation Sites within Search Radius				



Site-Name	Group-Name	common-name	scientific-name	GRANK	SRANK	Fed Status	st status	EO Rank	last obs date	precision
SWIFT CREEK RESERVOIR SCU	Invertebrate Animal	Yellow Lance	Elliptio lanceolata	G2G3	S2S3	SOC	SC	E	1999-10-08	S
Natural Heritage Resources within Search Radius										



Quads: HALLSBORO

Counties: Chesterfield

## Addison/Evans WTP

Company: DEQ-Piedmont  
Regional Office

Lat/Long: 372458/773844





## COMMONWEALTH of VIRGINIA

### DEPARTMENT OF CONSERVATION AND RECREATION

The project mapped as part of this report has been searched against the Department of Conservation and Recreation's Biotics Data System for occurrences of natural heritage resources from the area indicated for this project. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in Biotics files, **NATURAL HERITAGE RESOURCES HAVE BEEN DOCUMENTED** within two miles of the indicated project boundaries.

You have submitted this project to DCR for a more detailed review for potential impacts to natural heritage resources. DCR will review the submitted project to identify the specific natural heritage resources in the vicinity of the proposed project. Using the expertise of our biologists, DCR will evaluate whether your specific project is likely to impact these resources, and if so how. DCR's response will indicate whether any negative impacts are likely and, if so, make recommendations to avoid, minimize and/or mitigate these impacts. If the potential negative impacts are to species that are state- or federally-listed as threatened or endangered, DCR will also recommend coordination with the appropriate regulatory agencies: the Virginia Department of Game and Inland Fisheries for state-listed animals, the Virginia Department of Agriculture and Consumer Services for state-listed plants and insects, and the United States Fish and Wildlife Service for federally listed plants and animals. If your project is expected to have positive impacts we will report those to you with recommendations for enhancing these benefits.

Please allow up to 30 days for a response.

We will review the project based on the information you included in the Project Info submittal form, which is included in the report that follows. Often additional information can help us make a more accurate and detailed assessment of a project's potential impacts to natural heritage resources. If you have additional information that you believe will help us better assess your project's potential impacts, you may send that information to us. Please refer to the project Title (from the first page of this report) and include this pdf file with any additional information you send us.

Thank you for submitting your project for review to the Virginia Natural Heritage Program through the NH Data Explorer. Should you have any questions or concerns about DCR, the Data Explorer, or this report, please contact the Natural Heritage Project Review Unit at 804-371-2708.

its.

**Attachment G- Groundwater Report and Evaluation, Groundwater  
Monitoring Plan (approved 4/25/1990)**

# MEMORANDUM

## DEPARTMENT OF ENVIRONMENTAL QUALITY *Piedmont Regional Office*

4949-A Cox Road, Glen Allen, VA 23060-6296

804/527-5020

**SUBJECT:** Addison/Evans Water Production and Laboratory Facility Groundwater Evaluation

**TO:** File

**FROM:** Janine Howard

**DATE:** October 22, 2010

### Process and Background:

Addison/Evans Water Production and Laboratory Facility, located in Chesterfield County, Virginia supplies potable water to commercial and residential customers. The plant uses a settling basin and an anthracite/sand filter to treat water withdrawn from Swift Creek Reservoir. Wastewater results from filter backwashing and includes the sludge removed from the settling basin and basin washwater. The design average effluent flow for the facility is 0.50 MGD. Following the raw water intake the process involves flocculation, settling, filtration, storage, and distribution. Filter backwash and basin sludge are diverted to a sludge lagoon. Effluent from the sludge lagoon is discharged to the sanitary sewer for transfer to the Falling Creek WWTP for treatment. This permit is inactive and maintained for emergency purposes should discharge to the municipality be halted or unfeasible for any reason. The facility is located in the Piedmont and Blue Ridge Physiographic Province for which there are specific standards (9VAC25-280-50) and criteria (9VAC25-280-70). Virginia also has groundwater standards that are applicable statewide (9VAC25-280-40).

The groundwater monitoring plan was approved in April 1990. There are three monitoring wells, MW-3, located near the settling basins, is the up-gradient well. MW-1 is located in the southwest corner of the facility near the sludge lagoon and MW-2 is located in the northwest corner near the canal. Parameters monitored are: aluminum, sulfate, chloride, TSS, TOC, pH, and specific conductivity.

Quarterly monitoring data from March 2006- September 2010 was used for the evaluation. The data was evaluated for normality using the DEQ Piedmont Regional Office, Groundwater Analysis Spreadsheet which employs the Kolmogorov-Smirnov Test of Normality to make the determination. A Non-Parametric test was used to evaluate the presence or absence of a statistically significant difference between the background concentrations and down gradient concentrations of each pollutant for non-normal data; Student's t-test was used to evaluate normally distributed data. Table 1 summarizes the

groundwater data distribution type. Table 2 summarizes significant differences between the upgradient and downgradient wells. See Tables A.1- A.3 for the raw data for each well. Linear regression analysis (Table A.4 - A.8) was used to analyze whether there is a trend in groundwater concentration of particular parameters by means of a coefficient of determination ( $R^2$ ).

**Table 1.** Summary of Groundwater Data Distribution Type

Parameter	MW-1	MW-2
Aluminum	Normal	Normal
Sulfate	Normal	Non-normal
Chloride	Non-normal	Non-normal
TDS	Non-normal	Non-normal
TOC	Non-normal	Normal
pH	Non-normal	Non-normal
Specific Conductivity	Normal	Non-normal

**Table 2.** Summary of Groundwater Data Analysis

Parameter	Significant Difference from up-gradient well? (Up-gradient well= 3)	
	MW-1	MW-2
Aluminum	No	No
Sulfate	No	No
Chloride	Yes	Yes
TDS	Yes	Yes
TOC	Yes	Yes
pH	Yes- lower range only	Yes- lower range only
Specific Conductivity	No	No

Aluminum:

Aluminum concentration in the groundwater showed no significant difference between the up-gradient and down-gradient locations. There is no groundwater quality standard for aluminum. Aluminum concentrations for all three wells were reported as <0.05 mg/l from 2008 onward (prior to this aluminum was reported as <0.1 mg/l). The facility does not appear to be contributing to elevated aluminum values at down-gradient sites.

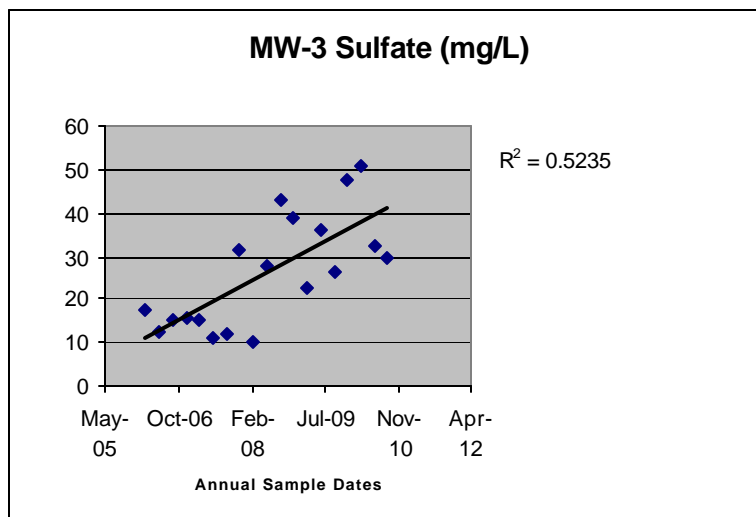
Sulfate:

Statistical analysis indicated there was no significant difference in sulfate concentrations between up-gradient and down-gradient wells. The results of the statistical evaluation are likely distorted by the fact that sulfate concentrations in MW-3, the background well, are so high. The average sulfate concentration from 2006-2010 for MW-1 was 2.54 mg/l, 10.1 mg/l for MW-2, and 26.1 mg/l for MW-3. The average for MW-3 using the five most recent values in Table A.3 (September 2009-September 2010) is an even higher 37.36 mg/l. The groundwater sulfate standard for the Piedmont and Blue Ridge region is 25 mg/l. While the sulfate concentrations in MW-1 and MW-2 are below the standard,

sulfate concentrations at MW-3 from approximately June 2008 onward violate the groundwater standard.

Elevated sulfate concentrations in the background well were noted during the 2006 permit reissuance. The previous site inspection report (May 19, 2004) discussed the sulfate impact to groundwater in MW-3 and attributed it to leakage from the secondary settling basins.

During the five year term of the current permit it appears the groundwater sulfate concentration at MW-3 has increased. Figure 1 shows the linear regression analysis and time series of sulfate concentration at MW-3. There is an increasing trend with an  $R^2$  value of 0.5235. There is a slight negative trend in sulfate concentration as MW-1 and no trend at MW-2 (Table A.4). Due to the contamination to the up-gradient well, assessment of the true impact to down-gradient wells is unreliable, therefore repositioning of the up-gradient well is needed in order to improve the ability to accurately assess groundwater impacts down-gradient.



**Figure 1.** Sulfate time series and linear regression at MW-3 (background well).

#### Chloride:

The chloride water quality criteria for the Piedmont and Blue Ridge Physiographic Province is 25 mg/l. Statistical analysis indicated there was a significant difference in chloride concentrations at both down-gradient wells. The average up-gradient concentration was 7.3 mg/l while it was greater at both MW-1 (9.90 mg/l) and MW-2 (11.9). However, none of these chloride values exceed the water quality criteria, therefore the facility is not causing a violation of the standard. Based on linear regression analysis chloride does show a slight positive trend at both MW-1 and MW-2 and no trend at MW-3 (Table A.5). For this reason continued monitoring is recommended for this parameter.

#### Total Organic Carbon (TOC):

The TOC groundwater criteria is 10 mg/l. The average concentration at MW-3 and MW-2 was almost equivalent, 1.5 and 2.01 mg/l respectively. TOC was elevated at MW-1

with an average of 6.61 mg/l, however the groundwater criteria is not exceeded. This is reflected in the statistical analysis with a statistically significant difference between the up-gradient and down-gradient wells. Table A.6 indicates a strong positive trend in TOC concentration over time at MW-2 ( $R^2 = 0.8063$ ) and a slightly weaker one at MW-1 ( $R^2 = 0.3101$ ). Although TOC concentrations are well below the groundwater criteria, due to the apparent positive trend in concentration over time, continued monitoring is required.

#### Total Dissolved Solids (TDS):

Statistical analysis indicated a significant difference in TDS concentrations at the down-gradient wells. The TDS water quality criteria is 250 mg/l. Table A.1 gives the raw data for TDS over the permitted term at MW-1. The March 2007 data point appears to be an outlier and is considerably lower than the majority of data. Omitting this value, the average TDS concentration at MW-1 was 261 mg/l, an exceedance of the groundwater standard. The majority of data for MW-1 are in excess of the standard, the highest value and most recent value being 302 mg/L in September 2010. As such, the operational units of the facility appear to be contributing to TDS contamination at the down-gradient well, MW-1. MW-2 average concentration was 206 mg/l, below the standard. Linear regression analysis indicates a slight positive trend in TDS concentration at all wells (Table A.7). Continued monitoring for this parameter is recommended with particular.

#### pH:

The groundwater criterion for pH in the Piedmont and Blue Ridge Region is 5.5-8.5 SU. The average concentration for each well was within this range. A statistical significant difference in pH was found at MW-1 and MW-2, as compared to the data for MW-3. Given the long-term average values for MW-1, MW-2, and MW-3 (6.63 SU, 6.60 SU, and 6.61 SU respectively), and the conformance with the groundwater criteria, it does not appear the facility is contributing to a groundwater violation with regard to pH.

#### Specific Conductivity:

There are no groundwater standards or criteria for specific conductivity. No significant difference was found for this parameter between up-gradient and down-gradient wells. Table A.8. indicates that there is a positive trend in this parameter as MW-1 and MW-2. The average specific conductance for MW-3 was 232 millimhos/cm. MW-1 has a similar average of 257, while MW-2 was slightly elevated at 305 millimhos/cm.

#### Summary and Recommendation:

Chloride, TOC and TDS are in conformance with groundwater criteria at this facility. However each of these parameters exhibit an increasing trend in concentration at down-gradient sites. This increase in ion concentration at downgradient wells likely explains the elevated specific conductivity in MW-1 and MW-2. Chloride, TOC, and TDS should continue to be monitored. Aluminum concentrations are low. pH is static and in conformance with groundwater criteria for all three wells at approximately 6.6.

The permit application reports an effluent ammonia concentration of 0.45 mg/L. The groundwater standard for ammonia is 0.025 mg/L; therefore, it is reasonable to conclude that the settling basin has the potential to contribute to groundwater contamination with



regard to ammonia. As such, it is recommended that the permittee add this parameter to the groundwater monitoring plan. Similarly, the groundwater standard for color is 15 color units and an effluent color of 80 color units was reported. Per GM98-2010, color is a suggested parameter for a “water supply” industrial source and should be incorporated into the revised groundwater monitoring plan. Total Suspended Solids (TSS) should also be monitored.

There is a clear sulfate contamination issue at the up-gradient well MW-3. This was noted during the previous permit reissuance. It is recommended that a revised groundwater monitoring plan be submitted to DEQ. The purpose of this plan will be to delineate the contaminant plume, its movement, and whether it has reached the property boundary. It is recommended that a new, uncontaminated, location for the up-gradient well be considered as part of the revised plan. Further groundwater monitoring and reporting requirements will be outlined in the Groundwater Monitoring permit special condition (Part I. B. 5).

## Appendix

Note: Values shown in red were reported as less than the shown value. For instance aluminum values were all reported as either <0.1 mg/l or <0.5 mg/l. For the purposes of this evaluation these values were treated as equal to the reported less than value.

**Table A.1.** MW-1 raw groundwater data

Date	Aluminum (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	TDS (mg/L)	TOC (mg/L)	pH (SU)	Specific Conductivity (millimhos/cm)
Mar-06	0.1	3.06	5.74	298	4.71	6.4	72.3
Jun-06	0.1	2.32	6.89	261	5.31	6.65	160
Sep-06	0.1	1.46	8.74	242	7.75	6.58	71.3
Dec-06	0.1	2.95	7.57	257	4.35	6.81	210
Mar-07	0.1	4.75	9.6	79	3.46	6.78	393
Jun-07	0.1	3.22	10.1	232	4.36	6.67	204
Sep-07	0.1	2.61	8.36	276	6.51	6.65	83.3
Dec-07	0.1	2.63	13.3	265	7.44	6.86	426.3
Mar-08	0.1	1.58	10.5	233	8.6	6.76	223.1
Jun-08	0.1	2.6	9.8	259	7.66	6.59	313.4
Sep-08	0.05	3.4	13.2	277	5.4	6.86	377.8
Dec-08	0.05	1.2	8.2	235	8.7	6.61	296.4
Mar-09	0.05	1.1	6.8	259	7.1	5.87	178.8
Jun-09	0.05	1.7	10	259	7.5	6.7	430.1
Sep-09	0.05	2.3	10.7	252	6.7	6.5	242.5
Dec-09	0.05	1.9	11.1	270	7	6.73	408
Mar-10	0.05	4.3	11.5	251	6	6.14	226
Jun-10	0.05	2.4	13.8	263	9.3	7.03	451
Sep-10	0.05	2.7	12.3	302	7.7	6.78	109
<b>Average</b>	0.08	2.54	9.90	251*	6.61	6.63	257

\* Omission the March 2007 TDS data point results in an average concentration of 261 mg/L TDS.

**Table A.2.** MW-2 raw groundwater data

Date	Aluminum (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	TDS (mg/L)	TOC (mg/L)	pH (SU)	Specific Conductivity (millimhos/cm)
Mar-06	0.1	9.47	8.99	184	1	6.53	260
Jun-06	0.1	9.72	10.9	195	1	6.57	279
Sep-06	0.1	11.7	10.3	188	1	6.55	276
Dec-06	0.1	13.5	10.4	211	1	6.69	296
Mar-07	0.1	9.03	11	166	1	6.58	269
Jun-07	0.1	9.61	10.7	174	2	6.35	275
Sep-07	0.1	11.1	10.9	192	1.05	6.58	235.1
Dec-07	0.1	9.96	10.8	204	1.13	6.81	315.2
Mar-08	0.1	1	1	189	1.4	6.4	195.5
Jun-08	0.1	11.5	11.4	193	1.44	6.85	318.2
Sep-08	0.05	11.6	14	203	1.5	6.69	327.9
Dec-08	0.05	11.1	13.1	214	2.5	6.72	307.7
Mar-09	0.05	9	12.4	210	3.1	6.34	318.8
Jun-09	0.05	7.4	9.5	226	3.3	6.91	365.7
Sep-09	0.05	9.5	16.3	202	3.1	5.38	338.4
Dec-09	0.05	11.8	17	241	3.1	7.26	348
Mar-10	0.05	13.7	18.5	245	2.6	6.18	324
Jun-10	0.05	11.3	15.8	247	3.5	7.24	363
Sep-10	0.05	9.6	13.9	232	3.5	6.81	388
<b>Average</b>	0.08	10.1	11.9	206	2.01	6.60	305

**Table A.3.** MW-3 raw groundwater data

Date	Aluminum (mg/L)	Sulfate (mg/L)	Chloride (mg/L)	TDS (mg/L)	TOC (mg/L)	pH (SU)	Specific Conductivity (millimhos/cm)
Mar-06	0.1	17.2	6.58	138	1.48	6.21	223
Jun-06	0.1	12.3	5.37	177	1.29	6.34	225
Sep-06	0.1	15.1	4.84	162	1.89	6.74	190
Dec-06	0.1	15.7	10.6	148	1.34	6.51	251
Mar-07	0.1	15.3	8.18	135	1.13	6.62	203
Jun-07	0.1	11.2	6.71	121	2	6.5	216
Sep-07	0.1	11.7	4.13	173	1.12	6.42	184.9
Dec-07	0.1	31.7	6.45	151	1.75	6.71	236.5
Mar-08	0.1	10.2	11.8	135	1.67	6.51	142.5
Jun-08	0.1	28.1	6.3	144	1.39	6.68	223.4
Sep-08	0.05	43	7.5	209	1	6.91	146.8
Dec-08	0.05	38.9	12.3	219	1.7	6.58	211.8
Mar-09	0.05	22.6	3.7	148	1.9	6.59	214.2
Jun-09	0.05	36.2	4.5	176	1.2	6.69	465.2
Sep-09	0.05	26.4	5.8	137	1.1	6.2	265.3
Dec-09	0.05	47.5	11.8	184	1.2	7.05	294
Mar-10	0.05	50.9	7	197	1.6	6.37	240
Jun-10	0.05	32.3	7.7	183	2.3	7.05	277
Sep-10	0.05	29.7	6.5	176	1.4	6.98	185
<b>Average</b>	0.08	26.1	7.3	164	1.5	6.61	232

**Table A.4.** Regression Analysis for Sulfate at MW-1, MW-2, and MW-3

<b>Monitoring Well</b>	<b>R<sup>2</sup> Value</b>
MW-1	0.0175
MW-2	0.0042
MW-3	0.5235

**Table A.5.** Regression Analysis for Chloride at MW-1, MW-2, and MW-3.

<b>Monitoring Well</b>	<b>R<sup>2</sup> Value</b>
MW-1	0.3966
MW-2	0.3422
MW-3	0.0093

**Table A.6.** Regression Analysis for TOC at MW-1, MW-2, and MW-3.

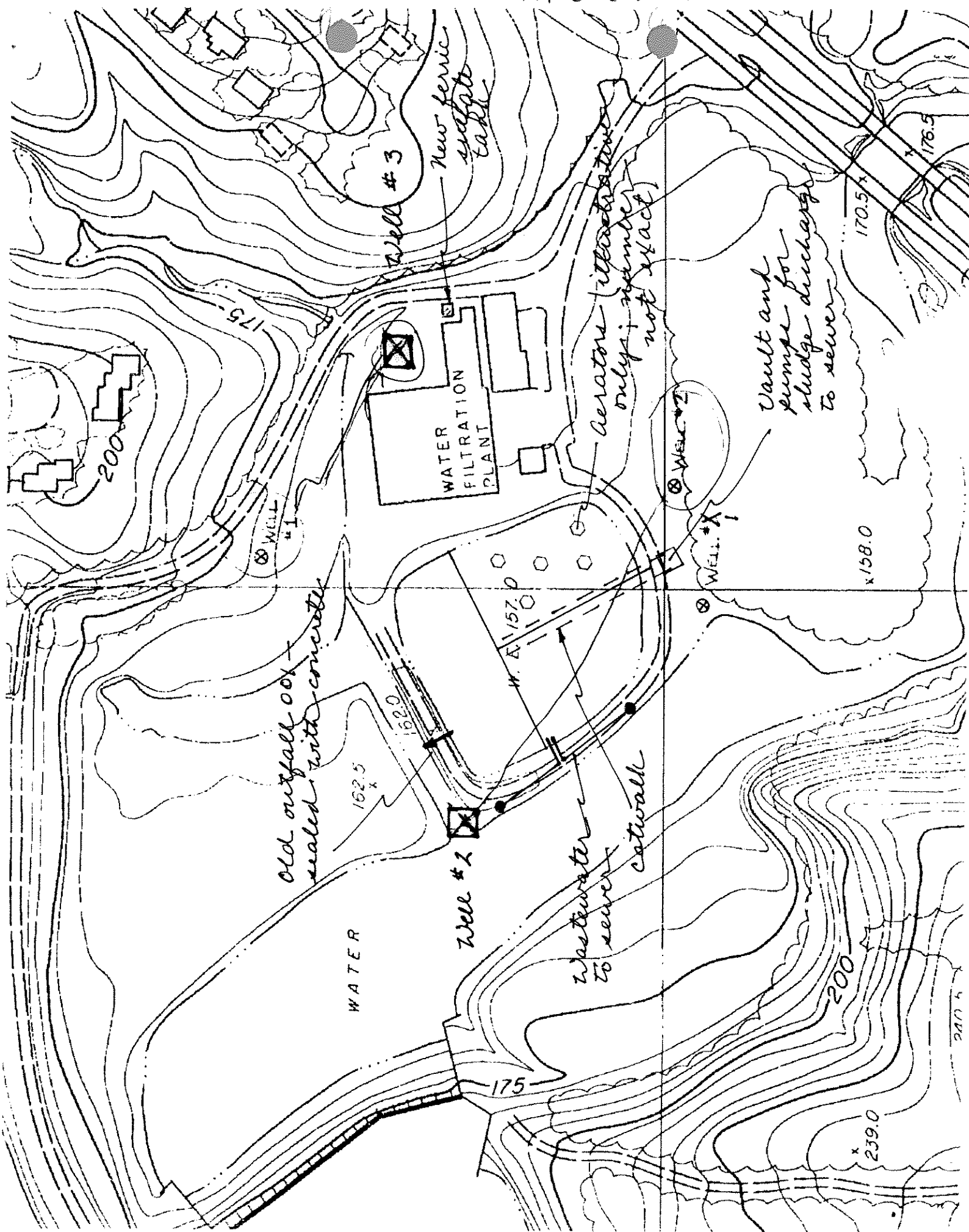
<b>Monitoring Well</b>	<b>R<sup>2</sup> Value</b>
MW-1	0.3101
MW-2	0.8063
MW-3	0.0055

**Table A.7.** Regression Analysis for TDS at MW-1, MW-2, and MW-3.

<b>Monitoring Well</b>	<b>R<sup>2</sup> Value</b>
MW-1	0.0563
MW-2	0.6454
MW-3	0.1931

**Table A.8.** Regression Analysis for Specific Conductivity at MW-1, MW-2, and MW-3.

<b>Monitoring Well</b>	<b>R<sup>2</sup> Value</b>
MW-1	0.1617
MW-2	0.5402
MW-3	0.0850





# COMMONWEALTH of VIRGINIA

## STATE WATER CONTROL BOARD

*2111 Hamilton Street*

Richard N. Burton  
Executive Director

Post Office Box 11143  
Richmond, Virginia 23230-1143  
(804) 367-0056  
TDD (804) 367-9763

Please reply to: Piedmont Regional Office  
2201 West Broad Street  
Richmond, Virginia 23220  
(804) 367-1006

April 25, 1990

Mr. Craig S. Bryant  
Assistant Director of Utilities  
Chesterfield County  
P.O. Box 40  
Chesterfield, VA 23832-0040

RE: Groundwater Monitoring Plan for the Swift Creek Water Treatment  
Plant VPDES Permit No. VA0006254

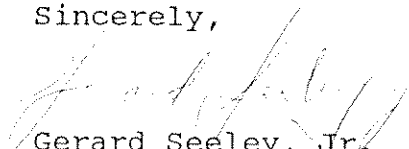
Dear Mr. Bryant:

This is in response to the Groundwater Monitoring Plan submitted for the Swift Creek Water Treatment Plant. The plan was submitted in accordance with Part I.B.4. of the VPDES Permit. Please note that our staff has reviewed the plan and it is approved, provided you relocate downgradient well #2, and upgradient well #1 as indicated on the attached map. This will provide optimal sampling points.

All downgradient wells should be located within 20 feet of the lagoon and the upgradient well should be at least 200 feet away from the lagoon. The well boring logs and as-built specifications should be submitted to the Piedmont Regional Office for our review and records upon the completion of these wells.

If you have any questions, please call Norman Little at 367-6777.

Sincerely,

  
Gerard Seeley, Jr.  
Regional Director

NL:kmw

CC: SWCB - OWRM

Permit No. VA0006254  
Addison/Evans WPLF

Department of Environmental Quality  
Groundwater Monitoring Form- Existing Plan (approved 4/25/1990)

Monitoring Period: \_\_\_\_\_

Date Sampled : \_\_\_\_\_

Parameter	Units	Sample Type	Well No. 1	Well No. 2	Well No. 3
Groundwater Elevation	Feet	Measured			
pH	S.U.	Grab			
Chlorides	mg/l	Grab			
Specific Conductance	umhos/cm	Grab			
Aluminum	mg/l	Grab			
Sulfate	mg/l	Grab			
Total Dissolved Solids (TDS)	mg/l	Grab			
Total Organic Carbon (TOC)	mg/l	Grab			

I certify that I am familiar with the information contained in this report and that to the best of my knowledge and belief such information is true, complete, and accurate.

\_\_\_\_\_  
**Signature of Authorized Agent**

\_\_\_\_\_  
**Name and Title of Authorized Agent**

\_\_\_\_\_  
**Date**

**Attachment H- WET Testing Review memo, WETLIM10**

## MEMORANDUM

### DEPARTMENT OF ENVIRONMENTAL QUALITY Piedmont Regional Office

4949-A Cox Road Glen Allen, VA 23060

(804) 527- 5020

**SUBJECT:** Toxics Management Program and Toxicity Test Data Review:  
Addison Evans WPLF (formerly Swift Creek WTP), VPDES Permit No.  
VA0006254

**TO:** Deborah DeBiasi, CO - TMP

**FROM:** Clinton T. Shettle, PRO

**DATE:** November 3, 2005

**COPIES:** File

Facility Name: Addison/Evans Water Production and Laboratory Facility  
(formerly Swift Creek Water Treatment Plant)

Permit Number: VA0006254

Receiving Stream: Swift Creek

Facility SIC: 4941

In-Stream Waste Concentration (IWC<sub>a</sub>): Outfall 001 = 100%

### FACILITY DESCRIPTION

The permit for this industrial discharger is in the process of reissuance. Addison/Evans WTPL (Chesterfield County) owns and operates this facility located in Chesterfield County. This facility is permitted to discharge water treatment plant wastewater and treated industrial wastewater through Outfall 001 to Swift Creek (and ultimately to the Appomattox River), but under normal operation it discharges directly to Falling Creek WWTP.

### FACILITY REQUIREMENTS

The current VPDES permit (expired January 9, 2005) does not contain a Toxics Management Program (TMP) requirement for outfall 001. Requirements for a TMP were in the preceding permit (expired January 9, 2000) and were based on the former Toxics Management Regulation which has since been repealed. The WET testing Special Condition attached has been drafted in accordance with new guidance, Guidance Memorandum 00-2012.

The permit that was reissued effective January 9, 1995 (expired 1/9/00) included a Toxics Management Program special condition requiring quarterly monitoring for a period of one year. Required acute toxicity testing included tests of 24-hour flow-proportioned composite samples using *Ceriodaphnia dubia* and fathead minnow, *Pimephales promelas*. Test protocols were to be submitted for approval no later than two months following the initiation of discharge.

The acute tests were required to be 48-hour static tests using *Ceriodaphnia dubia* and fathead minnow, *Pimephales promelas* with any LC<sub>50</sub> less than 100% to be repeated within three months. If the retest did not produce an LC<sub>50</sub> of 100%, quarterly testing of the particular outfall



was required for a period of one year. A Toxicity Reduction Evaluation would be required if less than 75% of the tests failed to produce an  $LC_{50}$  of 100%.

## **CONCLUSION AND RECOMMENDATION**

Whole Effluent Toxicity (WET) testing has never been done for this facility's Outfall 001. Initiation of discharge from Outfall 001 has not occurred to date. Overflow is considered unusual and extraordinary and therefore is not considered grounds to require immediate sampling for WET testing.

It is recommended that WET testing requirements be included in the current reissuance (in addition to Water Quality Standards monitoring) to resume if/when discharge from Outfall 001 into Swift Creek resumes.

The draft permit language is attached.

DRAFT TMP LANGUAGE FOR VPDES PERMIT NO. VA0006254

C. WHOLE EFFLUENT TOXICITY (WET) TESTING

1. Biological Monitoring:

- a. In accordance with the schedule in 2. below and **within three months of commencement of the discharge**, the permittee shall conduct quarterly acute toxicity tests for a period of one year using 24-hour flow-proportioned composite samples of final effluent from outfall 001. The acute multi-dilution NOAEC tests to use are:

48-hour static tests using *Ceriodaphnia dubia*

48-hour static tests using *Pimephales promelas*

These acute tests are to be conducted using 5 geometric dilutions of effluent with a minimum of 4 replicates, with 5 organisms in each. The NOAEC (No Observable Adverse Effect Concentration), as determined by hypothesis testing, shall be reported on the DMR converted to TUa (100/NOAEC). The LC<sub>50</sub> should also be determined and noted on the submitted report. Tests in which control survival is less than 90% are not acceptable. The acute tests should be able to show compliance with: NOAEC = 100%.

The permittee may provide additional samples to address data variability during the period of initial data generation. These data shall be reported and may be included in the evaluation of effluent toxicity. Test procedures and reporting shall be in accordance with the WET testing methods cited in 40 CFR 136.33.

- b. The test data will be evaluated by STATS.EXE for reasonable potential at the conclusion of the test period. The data may be evaluated sooner if requested by the permittee, or if toxicity has been noted. Should evaluation of the data indicate that a limit is needed, a WET limit and compliance schedule will be required and the toxicity tests of 1.a. may be discontinued.

2. Reporting Schedule:

The permittee shall report the results on the DMR and supply 1 copy of the toxicity test reports specified in this Toxics Management Program in accordance with the following schedule:

<u>Period</u>	<u>Compliance Periods</u>	<u>DMR/Report Submission Dates</u>
Quarter 1	By 3 months following discharge commencement.	10 <sup>th</sup> of the month
Quarter 2	3 to 6 months following discharge commencement.	immediately following
Quarter 3	6 to 9 months following discharge commencement.	each compliance
Quarter 4	9 to 12 months following discharge commencement.	period

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	<b>Spreadsheet for determination of WET test endpoints or WET limits</b>														
2															
3															
4	<b>Excel 97</b>			<b>Acute Endpoint/Permit Limit</b>			<b>Use as LC<sub>50</sub> in Special Condition, as TUA on DMR</b>								
5	<b>Revision Date: 01/10/05</b>														
6	<b>File: WETLIM10.xls</b>			<b>ACUTE</b>			<b>100% =</b>	<b>NOAEC</b>	<b>LC<sub>50</sub> = NA</b>			<b>% Use as</b>	<b>NA</b>	<b>TUA</b>	
7	<b>(MIX.EXE required also)</b>			<b>ACUTE WLA<sub>a</sub></b>			<b>0.3</b>	Note: Inform the permittee that if the mean of the data exceeds this TUA:			<b>1.0</b>	a limit may result using WLA.EXE			
8															
9															
10															
11				<b>Chronic Endpoint/Permit Limit</b>			<b>Use as NOEC in Special Condition, as TUC on DMR</b>								
12															
13	<b>CHRONIC</b>			<b>1.462574684</b>	<b>TU<sub>c</sub></b>	<b>NOEC =</b>			<b>69 %</b>	<b>Use as</b>	<b>1.44</b>	<b>TU<sub>c</sub></b>			
14	<b>BOTH*</b>			<b>3.000000074</b>	<b>TU<sub>c</sub></b>	<b>NOEC =</b>			<b>34 %</b>	<b>Use as</b>	<b>2.94</b>	<b>TU<sub>c</sub></b>			
15	<b>AML</b>			<b>1.462574684</b>	<b>TU<sub>c</sub></b>	<b>NOEC =</b>			<b>69 %</b>	<b>Use as</b>	<b>1.44</b>	<b>TU<sub>c</sub></b>			
16	<b>Enter data in the cells with blue type:</b>														
17	Entry Date:			11/09/10			<b>ACUTE WLA<sub>a,c</sub></b>			<b>3</b>	Note: Inform the permittee that if the mean of the data exceeds this TUC:			<b>1.0</b>	
18	Facility Name:			Addison/Evans WPLF			<b>CHRONIC WLA<sub>c</sub></b>			<b>1</b>					
19	VPDES Number:			VA0006254			* Both means acute expressed as chronic								
20	Outfall Number:			1											
21															
22	Plant Flow:			0.5 MGD			<b>% Flow to be used from MIX.EXE</b>			<b>Difuser /modeling study?</b>					
23	Acute 1Q10:			0 MGD			100 %			Enter Y/N <b>N</b>					
24	Chronic 7Q10:			0 MGD			100 %			Acute 1 :1					
25										Chronic 1 :1					
26	Are data available to calculate CV? (Y/N)			N			(Minimum of 10 data points, same species, needed)			Go to Page 2					
27	Are data available to calculate ACR? (Y/N)			N			(NOEC<LC50, do not use greater/less than data)			Go to Page 3					
28															
29															
30	IWC <sub>a</sub>			100 %			Plant flow/plant flow + 1Q10			<b>NOTE: If the IWC<sub>a</sub> is &gt;33%, specify the NOAEC = 100% test/endpoint for use</b>					
31	IWC <sub>c</sub>			100 %			Plant flow/plant flow + 7Q10								
32															
33	Dilution, acute			1			100/IWC <sub>a</sub>								
34	Dilution, chronic			1			100/IWC <sub>c</sub>								
35															
36	WLA <sub>a</sub>			0.3			Instream criterion (0.3 TUA) X's Dilution, acute								
37	WLA <sub>c</sub>			1			Instream criterion (1.0 TUC) X's Dilution, chronic								
38	WLA <sub>a,c</sub>			3			ACR X's WLA <sub>a</sub> - converts acute WLA to chronic units								
39															
40	<b>ACR -acute/chronic ratio</b>			10			LC50/NOEC (Default is 10 - if data are available, use tables Page 3)								
41	<b>CV-Coefficient of variation</b>			0.6			Default of 0.6 - if data are available, use tables Page 2)								
42	Constants eA			0.4109447			Default = 0.41								
43	eB			0.6010373			Default = 0.60								
44	eC			2.4334175			Default = 2.43								
45	eD			2.4334175			Default = 2.43 (1 samp)								
46															
47	LTA <sub>a,c</sub>			1.2328341			WLA <sub>a,c</sub> X's eA			**The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTA <sub>a,c</sub> and MDL using it are driven by the ACR.					
48	LTA <sub>c</sub>			0.6010373			WLA <sub>c</sub> X's eB								
49	MDL** with LTA <sub>a,c</sub>			3.000000074			TU <sub>c</sub> NOEC =			33.333333			(Protects from acute/chronic toxicity)		
50	MDL** with LTA <sub>c</sub>			1.462574684			TU <sub>c</sub> NOEC =			68.372577			(Protects from chronic toxicity)		
51	AML with lowest LTA			1.462574684			TU <sub>c</sub> NOEC =			68.372577			Lowest LTA X's eD		
52															
53	<b>IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU<sub>c</sub> to TU<sub>a</sub></b>														
54	MDL with LTA <sub>a,c</sub>			0.300000007			TU <sub>a</sub> LC50 =			333.333325 %			Use NOAEC=100%		
55	MDL with LTA <sub>c</sub>			0.146257468			TU <sub>a</sub> LC50 =			683.725769 %			Use NOAEC=100%		
56															
57															
58															

**Attachment I- NPDES Permit Rating Worksheet**

# NPDES PERMIT RATING WORK SHEET

NPDES NO. VA0006254

? Regular Addition  
 ? Discretionary Addition  
 ? Score change, but no status change  
 ? Deletion

Facility Name: Addison/Evans WPLF

City: Chesterfield

Receiving Water: Swift Creek

Reach Number: \_\_\_\_\_

*Is this facility a steam electric power plant (SIC=4911) with one or more of the following characteristics?*

1. Power output 500 MW or greater (not using a cooling pond/lake)
2. A nuclear power plant
3. Cooling water discharge greater than 25% of the receiving stream's 7Q10 flow rate

? YES; score is 600 (stop here) **X** NO (continue)

*Is this permit for a municipal separate storm sewer serving a population greater than 100,000?*

? YES; score is 700 (stop here)  
**X** NO (continue)

## FACTOR 1: Toxic Pollutant Potential

PCS SIC Code: \_\_\_\_\_ Primary SIC Code: 4941 Other SIC Codes:  
 Industrial Subcategory Code: \_\_\_\_\_ (Code 000 if no subcategory)

*Determine the Toxicity potential from Appendix A. Be sure to use the TOTAL toxicity potential column and check one)*

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
? No process waste streams	0	0	? 3.	3	15	<b>X</b> 7.	7	35
? 1.	1	5	? 4.	4	20	? 8.	8	40
? 2.	2	10	? 5.	5	25	? 9.	9	45
			? 6.	6	30	? 10.	10	50

Code Number Checked: 7

**Total Points Factor 1:** 35

## FACTOR 2: Flow/Stream Flow Volume *(Complete either Section A or Section B; check only one)*

### Section A **X** Wastewater Flow Only Considered

Wastewater Type (See Instructions)	Code	Points
Type I: Flow < 5 MGD	? 11	0
Flow 5 to 10 MGD	? 12	10
Flow > 10 to 50 MGD	? 13	20
Flow > 50 MGD	? 14	30
Type II: Flow < 1 MGD	<b>X</b> 21	10
Flow 1 to 5 MGD	? 22	20
Flow > 5 to 10 MGD	? 23	30
Flow > 10 MGD	? 24	50
Type III: Flow < 1 MGD	? 31	0
Flow 1 to 5 MGD	? 32	10
Flow > 5 to 10 MGD	? 33	20
Flow > 10 MGD	? 34	30

### Section B ? Wastewater and Stream Flow Considered

Wastewater Type (See Instructions)	Percent of instream Wastewater Concentration at Receiving Stream Low Flow	Code	Points
Type I/III:	< 10 %	? 41	0
	10 % to < 50 %	? 42	10
	> 50 %	? 43	20
Type II:	< 10 %	? 51	0
	10 % to < 50 %	? 52	20
	> 50 %	? 53	30

Code Checked from Section A or B: 21

**Total Points Factor 2:** 10

**FACTOR 3: Conventional Pollutants**  
(only when limited by the permit)

NPDES NO:

A. Oxygen Demanding Pollutant: (check one)    ? BOD    ? COD    ? Other: \_\_\_\_\_

Permit Limits: (check one)			Code	Points
	?	< 100 lbs/day	1	0
	?	100 to 1000 lbs/day	2	5
	?	> 1000 to 3000 lbs/day	3	15
	?	> 3000 lbs/day	4	20

Code Checked: \_NA\_

**Points Scored:** 0

B. Total Suspended Solids (TSS)

Permit Limits: (check one)			Code	Points
	?	< 100 lbs/day	1	0
	X	100 to 1000 lbs/day	2	5
	?	> 1000 to 5000 lbs/day	3	15
	?	> 5000 lbs/day	4	20

Code Checked: 2

**Points Scored:** 5

C. Nitrogen Pollutant: (check one)    ? Ammonia    ? Other: \_\_\_\_\_

Permit Limits: (check one)		Nitrogen Equivalent	Code	Points
	X	< 300 lbs/day	1	0
	?	300 to 1000 lbs/day	2	5
	?	> 1000 to 3000 lbs/day	3	15
	?	> 3000 lbs/day	4	20

Code Checked: 1

**Points Scored:** 0

**Total Points Factor 3:** 5

**FACTOR 4: Public Health Impact**

Is there a public drinking water supply located within 50 miles downstream of the effluent discharge (this includes any body of water to which the receiving water is a tributary)? A public drinking water supply may include infiltration galleries, or other methods of conveyance that ultimately get water from the above referenced supply.

X YES (If yes, check toxicity potential number below)

? NO (If no, go to Factor 5)

Determine the *human health* toxicity potential from Appendix A. Use the same SIC code and subcategory reference as in Factor 1. (Be sure to use the human health toxicity group column ? check one below)

Toxicity Group	Code	Points	Toxicity Group	Code	Points	Toxicity Group	Code	Points
? No process waste streams	0	0	? 3.	3	0	X 7.	7	15
? 1.	1	0	? 4.	4	0	? 8.	8	20
? 2.	2	0	? 5.	5	5	? 9.	9	25
			? 6.	6	10	? 10.	10	30

Code Number Checked: 7

**Total Points Factor 4:** 15

**FACTOR 5: Water Quality Factors**

NPDES NO.

- A. *Is (or will) one or more of the effluent discharge limits based on water quality factors of the receiving stream (rather than technology-based federal effluent guidelines, or technology-based state effluent guidelines), or has a wasteload allocation been assigned to the discharge:*

<b>X</b>	Yes	Code 1	Points 10
<b>?</b>	No	2	0

- B. *Is the receiving water in compliance with applicable water quality standards for pollutants that are water quality limited in the permit?*

<b>X</b>	Yes	Code 1	Points 0
<b>?</b>	No	2	5

- C. *Does the effluent discharged from this facility exhibit the reasonable potential to violate water quality standards due to whole effluent toxicity?*

<b>?</b>	Yes	Code 1	Points 10
<b>X</b>	No	2	0

Code Number Checked: A 1 B 1 C 2**Points Factor 5:** A 1 + B 0 + C 0 = 10 TOTAL**FACTOR 6: Proximity to Near Coastal Waters**

- A. *Base Score: Enter flow code here (from Factor 2):* 21

*Enter the multiplication factor that corresponds to the flow code:* 0.10

Check appropriate facility HPRI Code (from PCS):

	<i>HPRI#</i>	<i>Code</i>	<i>HPRI Score</i>	<i>Flow Code</i>	<i>Multiplication Factor</i>
?	1	1	20	11, 31, or 41	0.00
?	2	2	0	12, 32, or 42	0.05
?	3	3	30	13, 33, or 43	0.10
X	4	4	0	14 or 34	0.15
?	5	5	20	21 or 51	0.10
				22 or 52	0.30
				23 or 53	0.60
HPRI code checked: 4				24	1.00

HPRI code checked: 4Base Score: (HPRI Score) 0 X (Multiplication Factor) 0.1 = 0 (TOTAL POINTS)

- B. *Additional Points ? NEP Program*

*For a facility that has an HPRI code of 3, does the facility discharge to one of the estuaries enrolled in the National Estuary Protection (NEP) program (see instructions) or the Chesapeake Bay?*

<b>?</b>	Yes	Code 1	Points 10
<b>?</b>	No	2	0

- C. *Additional Points ? Great Lakes Area of Concern*

*For a facility that has an HPRI code of 5, does the facility discharge any of the pollutants of concern into one of the Great Lakes' 31 areas of concern (see Instructions)*

<b>?</b>	Yes	Code 1	Points 10
<b>?</b>	No	2	0

Code Number Checked:

A 4 B NA C NA**Points Factor 6:** A 0 + B 0 + C 0 = 0 TOTAL

**SCORE SUMMARY**

NPDES NO.

Factor	Description	Total Points
1	Toxic Pollutant Potential	<u>35</u>
2	Flows/Streamflow Volume	<u>10</u>
3	Conventional Pollutants	<u>0</u>
4	Public Health Impacts	<u>15</u>
5	Water Quality Factors	<u>10</u>
6	Proximity to Near Coastal Waters	<u>0</u>
TOTAL (Factors 1 through 6)		<u>75</u>

S1. Is the total score equal to or greater than 80? ☐ Yes (Facility is a major) ☒ No

S2. If the answer to the above questions is no, would you like this facility to be discretionary major?

☒ No☐ Yes (Add 500 points to the above score and provide reason below:

Reason:

NEW SCORE: 75OLD SCORE: 60Janine Howard  
Permit Reviewer's Name( 804 ) 527 5046  
Phone Number12/1/2010  
Date